BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

---- In the Matter of ----)		
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PUBLIC UTILITIES COMMISSION)		DOCKET NO. 2012-0036
)		
Regarding Integrated Resource)		
Planning.)		
)		

DECISION AND ORDER NO. 32052

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DECISION AND ORDER

By this Decision and Order, the commission rejects the Hawaiian Electric Companies' (HECO Companies)[1] Integrated Resource Planning Report (IRP Report).[2]

[1]HAWAIIAN ELECTRIC COMPANY, INC. (HECO), MAUI ELECTRIC COMPANY, LIMITED (MECO), and HAWAII ELECTRIC LIGHT COMPANY, INC. (HELCO) are collectively referred to as the "HECO Companies" or "Companies".

[2]The IRP Report includes the Action Plans for each island within the HECO Companies' collective service territory encompassing the islands of Oahu, Molokai, Lanai, Maui, and Hawaii. The various Action Plans are included in and supported by planning assumptions, analyses and Resource Plans presented in a single Integrated Resource Planning Report filed June 28, 2013 (IRP Report). The IRP Report was amended by provision of errata pages filed by the HECO Companies on August 1, 2013.

I.

Background

A.

Authority

The commission has general supervisory authority over all public utilities in Hawaii under Hawaii Revised Statutes ("HRS") section 269-6(a). In addition, the commission's authority to carry out investigations of public utilities is as follows:

> (a) The public utilities commission and each commissioner shall have power to examine into the condition of each public utility, the manner in which it is operated with reference to the safety or accommodation of the public, the safety, working hours, and wages of its employees, the fares and rates charged by it, the value of its physical property, the issuance by it of stocks and bonds, and the disposition of the proceeds thereof, the amount and disposition of its income, and all its financial transactions, its business relations with other persons, companies, or corporations, its compliance with all applicable state and federal laws and with the provisions of its franchise, charter, and articles of association, if any, its classifications, rules, regulations, practices, and service, and all matters of every nature affecting the relations and transactions between it and the public or persons or corporations.
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> ...
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> (c) Any investigation may be made by the commission on its own motion, and shall be made when requested by the public utility to be investigated, or by any person upon a sworn written complaint to the commission, setting forth any prima facie cause of

complaint. A majority of the commission shall constitute a quorum.[3]

The roles and responsibilities of the various stakeholders involved in the IRP process are specified by the commission's IRP Framework, revised on March 14, 2011 ("Framework").[4] Under the Framework, the commission has the principal responsibility of determining "whether the utility's Action Plan is in the public interest and represents a reasonable course for meeting the goal and objectives of integrated resources planning".[5] To make the necessary determinations required by the Framework, the commission is to "review the utility's Scenarios, Resource Plans, Action Plan, and evaluations, and generally monitor the utility's implementation of its Action Plan."[6] Further, the Framework states that the commission "shall approve, reject, approve in part or reject in part the Action Plan, or require modifications of the utility's Scenarios, Resource Plans, and Action Plan, as applicable."[7] The commission, therefore, determines in this Decision and Order the disposition

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[3]HRS §§ 269-7(a) and (c).

[4]Decision and Order, filed on March 14, 2011, in Docket No. 2009-0108, Exhibit A (*A Framework for Integrated Resource Planning, March 9, 1992, Revised: March 14, 2011*).

[5]Framework § III.A.1.

[6]Framework § III.A.3.

[7]Framework § III.A.3.

of the Hawaiian Electric Companies' Action Plans according to the requirements set out in the Framework.

B.

Procedural History

The commission instituted this proceeding via Order No. 30233 Initiating HECO Companies' Integrated Resource Planning Process, filed on March 1, 2012 ("IRP Opening Order") to examine the IRP Report and Action Plan of the Hawaiian Electric Companies, and named the Hawaiian Electric Companies and the DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS, DIVISION OF CONSUMER ADVOCACY ("Consumer Advocate") as parties.[8] Upon the commission's selection of both the IRP Independent Entity ("IE")[9] and the IRP Advisory Group ("Advisory Group"),[10] the Hawaiian Electric Companies established a one-year timeline and workplan for submission of the IRP Report, including Action Plans for each utility.[11]

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[8]See IRP Opening Order at 10.

[9]By letter dated May 1, 2012, the commission provided notification of the selection of Carl Freedman of Haiku Design and Analysis to serve as the IE.

[10]The Advisory Group was established by the commission on June 29, 2012 by Order No. 30513.

[11]See id. at 6.

On July 19, 2012, the commission issued Order No. 30534, which identified specific issues and questions to direct the IRP Process ("Principal Issues").[12]

The IRP process included participation of the Advisory Group, the IE and the HECO Companies in eleven Advisory Group meetings, five technical sessions, a stakeholder work session and a conference call.[13] With the exception of the third Advisory Group meeting, which was a three day workshop facilitated by a HECO Company consultant,[14] all of the Advisory Group meetings and sessions were facilitated by the IE. The IE provided agendas for each of the meetings and sessions and distributed materials presented at the Advisory Group meetings to the Advisory Group by electronic mail correspondence and by posting to a publicly accessible web site ("IE web site").[15] Advisory Group members submitted oral and written comments and questions to the

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[12]See Order No. 30534 Identifying Issues and Questions for the Hawaiian Electric Companies' Integrated Resource Planning Process, filed on July 19, 2012 ("Order No. 30534").

[13]IRP Report, Appendix D at D-8. In addition to the meetings and sessions identified in the IRP Report, an Advisory Group meeting was held, by order of the commission, on July 10, 2013 after the filing of the IRP Report.

[14]IRP Report at 5-2.

[15]The IE web site (http://irpie.com/) documented all Advisory Group materials, which were formally transmitted to the commission at several stages of the IRP process and are accessible on the commission's Document Management System.

HECO Companies by electronic transmittal to the IE for posting on the IE web site.

The IE filed four quarterly reports and four quarterly summary updates with the commission.[16] The quarterly reports provided a description of the scope of subject matter, activities and status of the Advisory Group process; identified issues and concerns; and transmitted the Advisory Group agendas and other documents provided by the IE.[17]

On December 21, 2012 the HECO Companies provided a "Notice of Completion" of the first two phases of the IRP Process.[18]

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[16]The four quarterly reports and summaries were filed with the commission on October 23, 2012, January 18, 2013, June 12, 2013 and August 5, 2013.

[17]In accordance with the Framework § III.C.2.c(2), the IE provided several written protocols to facilitate communications between the utility, Advisory Group and the public.

[18]The Framework § III.C.2.b(6)provides that the IE shall:

> certify that the planning process, up to the date of the certification, was conducted consistent with the framework. Each certification shall include such information as may be specified by the Commission and shall be provided to the Commission no later than ten (10) days following the utility's completion of each of the following key phases: establishment of the Scenarios to be evaluated, establishment of planning assumptions, end of the analyses resulting in the Resource Plans for the Scenarios, development of the Action Plan, and filing of the Integrated Resource Planning Report.

The IE provided "Protocols for Completion of Each Key Phase of the IRP Process", dated November 28, 2012 (filed with the commission as an attachment to the IE's second quarterly report on January 18, 2013.

On January 2, 2013 the IE timely filed with the commission a "Certification of Phases I & II of the HECO/MECO/HELCO IRP Process", dated December 31, 2012.[19]

On May 10, 2013 the IE provided to the HECO Companies and the Advisory Group the "IE Interim IRP Process Status Report and Statement of Concerns" (Interim Status Report). The Interim Status Report explains:

> The IE provides this status report and statement of concerns … to inform the HECO Companies, the [Advisory Group] and the Commission that, based on the information and materials provided by the HECO Companies to date and based on statements by the HECO Companies regarding what further information and analysis will be provided, unless supplemented by further analysis, the IE will not be able to certify that the IRP process is being conducted consistent with the Revised IRP Framework … and will not sufficiently or meaningfully address the Principal Issues identified for the IRP process.

Interim Status Report at 1.

In response to several communications from Advisory Group members "expressing concerns and offering suggestions and/or requests regarding the procedures at the final phase of the IRP process", on June 21, 2013 the commission issued Order No. 31311 amending the HECO Companies' schedule to conduct

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[19]Because the HECO Companies' Notice of Completion was served on the IE by first class mail, two days are added to the ten day period allowed for filing of the IE Certification.

their IRP process submitted on May 30, 2012, to provide for an additional Advisory Group meeting after the filing of the IRP Report; inviting and providing for additional Advisory Group comments and HECO Companies' responses; and extending the date for the IE to provide the certification of the outstanding phases of the IRP process until ten days after the additional Advisory Group meeting.

On June 28, 2013 the HECO Companies timely filed the IRP Report including the Action Plans for each of the HECO Companies. The IRP Report includes an executive summary, twenty-two chapters and appendices. The IRP Report documents the development of the IRP process objectives and metrics, principal issues, scenarios, forecasts, resource options, analyses, Resource Plans and Action Plans for each of the HECO Companies. The IRP Report was subsequently amended by provision of errata pages filed by the HECO Companies on August 1, 2013.

The additional Advisory Group meeting required by Order No. 31311 was held on July 10, 2013.

On July 15, 2013 the commission issued Order No. 31359, CLARIFYING INTERVENTION REQUIREMENTS, establishing July 29, 2013 as the deadline for petitions to intervene in this docket.

On July 15 and 17, 2013, Advisory Group comments were timely submitted to the IE in accordance with the comment period specified in Order No. 31311.

On July 19, 2013 the commission issued Order No. 31366 extending the time allowed for the IE to file the certification of the final phases of the IRP process with the commission from July 22, 2013 until July 29, 2013.

On July 29, 2013 the IE timely filed with the commission the "Final Certification of the HECO/MECO/HELCO Integrated Resource Planning Process: Certification of Key Phases III, IV and V" (Final Certification). The Advisory Group comments submitted to the IE on July 15, 2013 and July 17, 2013 were filed with the commission as attachments to the Final Certification.

Fourteen motions to intervene and/or participate in the docket were timely filed with the commission. Motions to intervene were submitted by 1) DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT, AND TOURISM (DBEDT); 2) COUNTY OF HAWAII (COH); 3) LIFE OF THE LAND (LOL); 4) RENEWABLE ENERGY ACTION COALITION OF HAWAII, INC. (REACH); 5) PUNA PONO ALLIANCE (PPA); 6) BLUE PLANET FOUNDATION (BPF); 7) I ALOHA MOLOKA'I (IAM); 8) HAWAII SOLAR ENERGY ASSOCIATION (HSEA); 9) HAWAII RENEWABLE ENERGY ALLIANCE (HREA); 10) SIERRA CLUB (SC); 11) FIRST WIND HOLDINGS, LLC (FWH);

12) BIG ISLAND COMMUNITY COALITION (BICC); 13) KAULANA KAHO'OHALAHALA and MATTHEW MANO (KKMM); 14) HAWAII PV COALITION (HPVC); (collectively, "Intervenors"). In addition, THE GAS COMPANY, LLC, dba HAWAI'IGAS (TGC) filed a motion for participation without intervention.

On September 9, 2013 the commission issued Order No. 31443 ADDRESSING FILED MOTIONS TO INTERVENE AND MOTION TO PARTICIPATE WITHOUT INTERVENTION, AND PROVIDING GUIDANCE ON INTEGRATED RESOURCE PLANNING MATTERS ("Order No. 31443"), granting intervenor status to all movants with the exception that TGC was admitted as a participant without intervention, limited to participation regarding certain issues.

Order No. 31443 also identified the issues to be considered in the review of the IRP Report in this docket, bifurcated cost recovery of utility expenditures on the IRP process to a separate future docket, identified a list of "inclinations" regarding the disposition of the instant docket, required a statement of position (SOP) and reply statement of position (RSOP) to be filed by each party and TGC addressing several questions, and invited comments from the Advisory Group.[20]

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[20]The IE was instructed to invite Advisory Group members to provide comments consistent with the provisions of the Order.

SOP's were timely filed by all of the Intervenors and participant in this docket with the exception of IAM and BICC. Timely RSOP's were filed by DBEDT, COH, REACH, BPF, HECO Companies, Consumer Advocate, SC, KKMM, HPVC, and TGC. Two comments were timely filed by members of the public.[21]

C.

Issues

The goal of IRP, per the Framework, is

> to develop an Action Plan that governs how the utility will meet energy objectives and customer energy needs consistent with state energy policies and goals, while providing safe and reliable utility service at reasonable cost, through the development of Resource Plans and Scenarios of possible futures that provide a broader long-term perspective.[22]

The commission's primary responsibility in this proceeding is to review and determine whether the Hawaiian Electric Companies' submitted IRP Report is in the public interest and

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[21]Comments of Sally Kaye, Friends of Lanai (Advisory Group member), dated September 25, 2013, filed September 26, 2013 (Sally Kaye's Comments); Letter from County of Maui, Office of Economic Development, joint comments by Douglas McLeod and Kalvin Kobayashi (Advisory Group members), dated and file October 1, 2013 (COM Comments).

[22]Framework § II.A.

represents a reasonable course for meeting the goal and objectives of IRP process in accordance with the Framework.[23]

As established by Order No. 31443, the issues in this proceeding are:

1. Whether the IRP process and IRP Report, including Scenarios, Resource Plans, and Action Plans, are consistent with the IRP Framework.

2. Whether the IRP Report meaningfully addresses the Principal Issues identified in the IRP process, including the questions and issues identified by the commission by Order No. 30534.

3. Whether the commission should approve, reject, either in whole or in part, or require modifications of the submitted IRP Report, including Scenarios, Resource Plans, or Action Plans.

D.

Positions of the Parties

In Order No. 31443, the commission provided the following questions to aid the parties and TGC in providing

[23]See Framework § III.A.1; See also IRP Opening Order at 4.

respective simultaneous SOP's concerning the IRP Report, Action Plans, and overall IRP process:[24]

> 1. Given the assertions made in both the IE Final Certification and Advisory Group comments submitted pursuant to Order No. 31311, is it possible at this time for the commission to determine without further procedural steps whether the IRP Report, Action Plans, and IRP process, as filed and conducted by the Hawaiian Electric Companies, are reasonably compliant or clearly non-compliant with the Framework?
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> ***
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> 2. Given your response to question 1 above, how should the commission proceed in its review of the IRP Report, Action Plans, and overall IRP process initiated by the IRP Opening Order? The Framework contemplates a six (6) month commission review period of the submitted IRP Report and Action Plans.[25] Any recommended procedural processes you identify in your response should take into account those initial steps concerning the submission of statements of position and reply statements of position already determined by the commission and outlined below in this section.

Order No. 31443 at 19-20 (footnote in original).

All parties stating positions, with the exception of KKMM, agree that it is possible at this time for the commission to

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[24]As previously noted, the scope of TGC's statement of position and reply statement of position, where applicable, were limited to the issue discussed in Section II.B. of Order No. 31443.

[25]Framework IV.C.11. at 12.

determine without further procedural steps whether the IRP Report, Action Plans, and IRP process, as filed and conducted by the Hawaiian Electric Companies, are reasonably compliant or clearly non-compliant with the Framework.[26]

Furthermore, all parties stating positions, with the exception of REACH and the HECO Companies, take the position that the IRP Report is not compliant with the Framework.[27] The HECO Companies take the position that

> "[t]he Companies reasonably complied with the IRP Framework by completing the requisite IRP analyses/process and filed the IRP Report and Action Plan for each utility company

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[26]HECO SOP at 3 ("The Companies maintain that the Companies' 5-year Action Plans are ready for Commission decision making based on the record."); CA SOP at 16; DBEDT SOP at 6; COH SOP at 6; LOL SOP at 23; REACH SOP at 5-6 and RSOP at 8; PPA SOP at 3-4 and 8 (implied); BPF SOP at 2 and RSOP at 2; SC SOP at 2-3 (implied); FWH SOP at 6 (defers); COM Comments at 2; Sally Kaye Comments. TGC did not state a position on this matter (TGC SOP at 3). KKMM states that compliance with the Framework cannot be determined without further procedural steps. (KKMM SOP at 1).

[27]CA SOP at 8 ("accepts and will not take issue" with IE findings regarding compliance in Final Certification); DBEDT SOP at 5 ("not entirely compliant with Framework"); COH SOP at 1 (agreeing with IE findings in Final Certification); LOL SOP at 8 and 22 (implied); PPA SOP at 3-8 (citing specific deficiencies); BPF RSOP at 2-3 (implied) with HSEA and HREA joining BPF; SC SOP at 1-3 (citing specific deficiencies) with HPVC joining SC; KKMM RSOP at 2-3 (implied); COM Comments at 1; Sally Kaye Comments; TGC SOP at 3 (TGC states that it takes no position); REACH RSOP at 7 (the "IRP Report and Action Plans are sufficiently compliant with the Framework and other commission requirements to warrant further examination in the form of "lessons learned" from the overall IRP process…").

within the one year timeframe required by the IRP Framework."[28]

LOL holds that the IRP Report and Action Plans should be rejected but that discovery should be allowed if there are further proceedings.[29] COH supports a decision that the Action Plans are not in the public interest and do not provide a reasonable course for meeting IRP goals and objectives.[30] The Advisory Group members who filed comments support or recommend rejection of the IRP Report in whole.[31]

The Consumer Advocate recommends that the IRP Report be rejected. However, the Consumer Advocate also recommends that the commission should, prior to rejecting the IRP Report, allow the HECO Companies a chance to remedy the identified deficiencies within a period of thirty days.[32]

However, many of the parties, including, DBEDT, REACH, PPA, BPF, HSEA, HREA, SC, FWH, KKMM, and HPVC, maintain that further steps should be taken as part of this proceeding to allow supplementation or amendments to the IRP Report, prior to a

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[28]HECO SOP at 3.

[29]LOL SOP at 23.

[30]COH SOP at 6.

[31]Sally Kaye's Comments at 1; COM Comments at 1.

[32]CA SOP at 16.

decision by the commission regarding approval or rejection of the IRP Report and Action Plans.

DBEDT states that the IRP Report and Action Plans, although not compliant with the IRP Framework, have essential value, serve purposes supporting other studies, and should be accepted as "filed with, but not approved by the Commission".[33] The Consumer Advocate, in its RSOP, stated that it would not object to DBEDT's recommendation if it is determined that there are major shortcomings in the IRP Report that cannot be resolved in a reasonable time.[34]

All parties were asked in Order No. 31443 to address a list of summarized conclusions made by the IE in the Final Certification at pages 4-8 as well as the stand-alone comments submitted by the Advisory Group pursuant to Order No. 31311, included as attachments to the Final Certification.

The HECO Companies' SOP provides responses to each of the conclusions in the Final Certification Summary of Findings.[35] All of the other parties concur with or do not contest the conclusions in the Final Certification.

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[33]DBEDT SOP at 2-4 and 18.

[34]CA RSOP at 2.

[35]See HECO SOP §§ II-IV.

None of the parties explicitly addressed, as directed in Order No. 31443, the full scope of stand-alone comments submitted by the Advisory Group pursuant to Order No. 31311, that were included as attachments to the Final Certification (collectively "July AG Comments"). Timely July AG Comments were provided by The Nature Conservancy, Sally Kaye, U.S. EPA Region 9, Consumer Advocate, DBEDT, HSEA, County of Maui, BPF, Earthjustice, Karen M. Holt, LOL, and Warren S. Bollmeier.

The HECO Companies' SOP provided responses to some of the concerns addressed in the July AG Comments filed by the Consumer Advocate, including concerns regarding provision of a base plan,[36] analysis of procedures addressing selection of firm resource options,[37] ranking final resource plans,[38] and the IRP process schedule,[39] which are further discussed below, as applicable.

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[36]HECO SOP at 46-47.

[37]HECO SOP at 54-55.

[38]HECO SOP at 57-58

[39]HECO SOP at 59-61

II.

Discussion

A.

Sufficiency of Existing Record for Decision

The commission concurs with the HECO Companies and the large majority of the parties in this proceeding that it is possible at this time for the commission to determine without further procedural steps whether the IRP Report, Action Plans and IRP process, as filed and conducted by the HECO Companies, are reasonably compliant or clearly non-compliant with the IRP Framework.[40] Given the nature of this proceeding (i.e., to review long term utility integrated resource planning); the extensive record in this proceeding, including documentation of the Advisory Group meetings, utility analyses and filings made throughout the duration of the IRP process, reports and certifications provided by the IE, the HECO Companies' IRP Report itself, comments provided by Advisory Group members and the SOP's and RSOP's provided by the parties and participant; the record is clearly sufficient to allow for commission decision-making.

[40]As noted above, only one party asserts that further procedural steps are necessary to reach a decision in this investigation.

B.

Certification by the IE

The Framework provides several roles for the IE in the overall IRP process, including monitoring, reporting, facilitation, and advisory responsibilities.[41] One important reporting responsibility is certification that the planning process has been conducted consistent with the Framework. In accordance with the Framework, the IE provided "Certification of Phases I & II of the HECO/MECO/HELCO IRP Process" on January 2, 2013 (Phase I & II Certification) and the Final Certification addressing all phases of the IRP process on July 29, 2013.[42]

In the Final Certification, the IE states that "[t]he IE cannot certify that the HECO Companies' planning process was conducted consistent with the Framework" and that "several aspects of the IRP process, the IRP Report and the Action Plans, are not

[41]The roles of the IE are specified primarily by Framework section III.C., as well as by Framework sections: III.B.5; III.B.6; III.F.7; III.F.8; IV.D.7.b; V.B.2.b; and V.C.7.c.

[42]Both of the certifications provided by the IE note that several aspects of the Phase I & II Certification are provisional and pertain to matters and submissions by the utilities that are not finalized until much later with the filing of the completed IRP Report. The Final Certification therefore addresses all five phases of the IRP process. See Phase I & II Certification at 3; Final Certification at 2.

compliant with specific Framework requirements and do not meaningfully address several of the Principal Issues."[43]

The Final Certification includes extensive discussion regarding compliance with requirements in the Framework and whether the Principal Issues were meaningfully addressed.[44] Several specific issues are examined regarding uncertainty, feasibility, and cost in the supporting analyses in the IRP Report, as well as observations regarding the IRP process and schedule.[45] The Final Certification includes specific conclusions regarding compliance with each relevant provision of the Framework[46] and regarding each of the identified Principal Issues.[47]

The IE clarifies that the IRP Report and Action Plans are compliant with many Framework provisions and that for purposes of brevity, the IE's summarized conclusions are focused on identified shortcomings in the IRP process, IRP Report and the included Action Plans.[48]

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[43]Final Certification at 4.

[44]Final Certification at 4-8.

[45]Final Certification at 9-17.

[46]Final Certification at 18-37.

[47]Final Certification at 38-65.

[48]Final Certification at 4.

As noted above, with the exception of the HECO Companies, none of the other parties take issue with or contest any of the conclusions made by the IE in the Final Certification.

Although the HECO Companies provide at least some response to the IE's assertions in the Final Certification, on careful review of the record and as discussed with respect to several specific issues below, the commission finds the conclusions reached by the IE in the Final Certification, with only one exception, to be well founded, accurate, and generally consistent with the commission's own analysis and its own direct and contemporaneous observations throughout the IRP process.[49]

C.

Issue #1: Compliance with the Framework

The first of three general issues established by Order No. 31443 in this proceeding is:

> 1. Whether the IRP process and IRP Report, including Scenarios, Resource Plans, and Action Plans, are consistent with the IRP Framework.

[49]As discussed below, the commission does not accept the IE's conclusion that "[t]he HECO companies did not enlist the participation of the Advisory Group in determining meaningful methods to measure or present rate impacts." See Final Certification at 6.

As further discussed below, the commission finds that the IRP Report is clearly non-compliant and inconsistent with the Framework in several fundamental and crucial respects, including but not limited to failure to provide sufficient meaningful analysis in support of the Action Plans, as required by the Framework;[50] failure to determine final Resource Plans by ranking or prioritizing the Resource Plans according to established criteria;[51] failure to determine Action Plans transparently in accordance with Framework requirements regarding consideration of planning objectives[52] and providing robust value in accordance with scenario planning principles;[53] and failure to adequately incorporate Advisory Group input into resource option screening, final Resource Plan and Action Plan determination, and assessment of Action Plan affordability.[54]

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[50]See Framework § V.B.2.a.

[51]Framework § V.C.9.

[52]Framework §§ V.C.4.b.-V.C.4.d.

[53]Framework § V.C.10.b.

[54]Framework § V.C.6.; Framework § V.C.9; See generally

As noted above, the IE and all parties stating positions, with the exception of the HECO Companies and REACH, take the position that the IRP Report is not compliant with the Framework.[55]

The HECO Companies take the position that they "reasonably complied with the IRP Framework by completing the requisite IRP analyses/process" and suggest that the commission's determination of compliance should include consideration of several factors, including the enormous amount of work done and the number of plans created,[56] the longer periods of time required and allowed for implementation in previous IRP cycles[57] and consideration that perfect plans are not the critical objective in light of the need for timeliness.[58]

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[55]CA SOP at 8 ("accepts and will not take issue" with IE findings regarding compliance in Final Certification); DBEDT SOP at 5 ("not entirely compliant with Framework"); COH SOP at 1 (agreeing with IE findings in Final Certification); LOL SOP at 8 and 22 (implied); PPA SOP at 3-8 (citing specific deficiencies); BPF RSOP at 2-3 (implied) with HSEA and HREA joining BPF; SC SOP at 1-3 (citing specific deficiencies) with HPVC joining SC; REACH RSOP at 7; KKMM RSOP at 2-3 (implied); COM Comments at 1; Sally Kaye Comments; TGC SOP at 3 (TGC states that it takes no position); REACH RSOP at 7 (REACH explains the Action Plans "warrant further examination in the form of 'lessons learned' from overall IRP process…").

[56]HECO SOP at 3-6, 48-51.

[57]HECO SOP at 6.

[58]HECO SOP at 10. Several parties also assert that perfection is not a desirable or constructive objective in arguing for providing opportunity to address identified concerns and modify the IRP Report and Action Plans.

The commission does not accept that the amount of work performed by the utility or the sheer quantity of resource plans developed should be the determining factor regarding whether the IRP Report and Action Plans are reasonably consistent with the Framework. Several standards are provided in the Framework, notably including requirements that the IRP Report must "provide meaningful support for the reasonableness of the Action Plan."[59] The pertinent question is not how much time, labor or modeling was performed in preparing the IRP Report; the question is whether the resulting analyses provide meaningful support for the HECO Companies' determination of the Resource Plans and Action Plans and whether the analyses sufficiently address the Principal Issues.[60]

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[59]Framework § V.B.2.a.

[60] A separate section of the Framework addresses the number of resource plans that may be appropriate, providing that

> [a] sufficient number of Resource Plans will be developed and analyzed to ensure that the results of the utility planning process are meaningful and will address the scope of the identified issues. However, the number and scope of Resource Plans developed and analyzed will consider the limitations of utility planning resources and the planning process schedule. Framework § V.B.8.b.

It cannot be reasonably argued that this provision of the Framework supports the supposition that merely developing and analyzing a large number of resource plans will be sufficient or ensure that the results of the utility planning process are meaningful or will sufficiently address the scope of the identified issues.

Nor does the commission accept that the amount of time allowed or required in previous IRP efforts is a reasonable basis for determinations of compliance with Framework requirements. The Order adopting the Framework identifies the extended delays in completing prior IRP cycles as a problem[61] and emphasizes the need for timely execution of the IRP process in the establishment of the current Framework.[62] The commission observes that it is the utility's responsibility to implement the IRP process in compliance with the Framework. The utility establishes its own schedule and work plan for the IRP process. Accordingly, the utility is responsible for providing or procuring the necessary expertise, appropriate models and analytical tools, and sufficient personnel and support from management to effectively execute the Framework requirements in a timely manner.

Nonetheless, the commission recognizes the Action Plans are intended to remain flexible and are subject to regular evaluation and updating. Indeed, the commission has affirmed these principles in the Framework and the Order Adopting the Revised Framework. However, in light of the substantial shortcomings identified in the HECO Companies' IRP Report, considerations or aspirations regarding perfection are not relevant.

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[61]Order Adopting Revised Framework at 34-36.

[62]Order Adopting Revised Framework at 94-97.

HECO asserts that most of the comments by the IE and Advisory Group members appear to center around the IRP process rather than the content of the Action Plans.[63] The commission does not concur with HECO's conclusion that most of the comments by the IE and AG members are not applicable to the review of the Action Plans or are solely related to process issues that have no bearing on providing meaningful support for the Action Plans. Nor does the commission concur with any suggestion that the shortcomings of the IRP Report and Action Plans are predominantly the result of the Framework requirements.

1.

Meaningful Analysis Supporting the Action Plans

The Framework requires that analysis included in the IRP Report shall "provide meaningful support for the reasonableness of the Action Plan".[64] This Framework provision states in concise terms part of a fundamental tenet: the IRP Report and Action Plans must be more than filings listing a utility's intentions and expected actions; the IRP Report must include meaningful supporting analysis that forms the basis of the

[63]HECO SOP at 3, 8-9.

[64]Framework § V.B.2.a.

development of the Action Plans, consistent with several specific Framework provisions. The Framework also requires that the utility identify Principal Issues that must be addressed in the planning process, planning analysis and the resulting plans and Action Plans.[65] Here, the commission addresses procedural and Framework compliance-related aspects of the HECO Companies' supporting analysis. Separately, below in Section D., the commission further addresses the HECO Companies' analysis regarding the Principal Issues.

As further discussed below, the commission finds that there are fundamental deficiencies in the analyses supporting the Resource Plans and Action Plans. The HECO Companies' analyses do not adequately demonstrate the feasibility or accurately determine the cost of incorporating the extensive amounts of variable renewable generation presumed in the final Resource Plans and Action Plans. The analyses do not employ appropriate modeling tools and techniques sufficient to assess the impacts and characteristics of high penetrations of variable renewable generation resources. The analyses thereby fail to reach reasonable or meaningful conclusions regarding the determination of appropriate resource selections or resource mix. Furthermore, the analysis does not sufficiently consider the

[65]Framework § V.C.1.

feasibility or costs of system operations, the extent of the need for or selection of resources to provide required ancillary services, or the ultimate costs and rate impacts of the Resource Plans and Action Plans. The analyses fail to adequately incorporate evaluation of the benefits and costs (including rate impacts) of several other critical elements of the proposed Action Plans, including but not limited to smart grid investments, inter-island or inter-utility transmission, modifications to existing generation units for improved flexibility and efficiency, and the retirement and possible replacement of existing generation.

As a result, the HECO Companies' analyses in the IRP Report do not sufficiently or meaningfully support the determination of the final Resource Plans of Action Plans.

Modeling Approach and Technical Analyses

Various aspects of the HECO Companies' approach to modeling long term resource options was identified as problematic by the Advisory Group throughout the IRP process. In addition, the HECO Companies were informed early in the IRP process that the particular scenario planning methods that were adopted by the HECO Companies were time consuming and added unnecessary complexity to the process.[66] After the HECO Companies' filed the

[66]Final Certification at 16.

IRP Report in June 2013, the IE provided the Final Certification, which concludes that the modeling analyses used by the HECO Companies do not produce accurate or credible results.[67]

The IE concludes that the modeling analyses: underestimate the amounts of curtailment of variable renewable generation, produce results that are not consistent with actual experience on existing HECO Company utility systems or the finding of more detailed recent studies of the HECO Company systems,[68] and do not sufficiently account for utility system operational characteristics associated with the extensive amounts of variable renewable generation assumed in the planning period.[69] As a result, the modeling analysis underestimates system operation costs, does not identify supporting ancillary resource needs and does not provide a valid determination of the most economical and appropriate firm generation resources for the utility systems.[70]

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[67]Final Certification at 11-12.

[68]Final Certification at 11 (citing the Hawaii Solar Integration Study (HSIS) for the HECO and MECO Maui Island systems described in the IRP Report at 8-7, 8-11, 8-12).

[69]Final Certification at 12-13.

[70]Final Certification at 13.

Furthermore, the Consumer Advocate's consultant states that the "Strategist" model used by the HECO Companies in the planning analysis is not, by itself, sufficient to produce adequate results.

> HECO is using Strategist to evaluate the need for new capacity to meet Loss of Load Hour constraints while also curtailing substantial levels of wind and solar. Strategist is not able to model the hourly ramp up and ramp down constraints associated with a combination of high levels of wind and solar.[71]

The Consumer Advocate concludes that a more detailed analysis is required and recommends that an hourly dispatch model would be more appropriate to provide focused analysis and/or benchmarking.[72] The commission observes that this type of modeling analysis (hourly dispatch) is routinely used by the HECO Companies in many other proceedings before the commission.

The HECO Companies' respond primarily to only the assertion addressing the feasibility of siting large assumed amounts of renewable generation on the Island of Oahu.[73] The IE's specific conclusions regarding the feasibility of incorporating unprecedented amounts of variable renewable generation on the

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[71]Consumer Advocate's Advisory Group Comments, July 17, 2013, *Comments on the IRP Analysis & Action Plan*, Synapse Energy Economic, Inc. ("CA July AG Comments") at 18.

[72]Id.; See also CA SOP at 11.

[73]HECO SOP at 11-15.

utility systems, shortcomings in the modeling analysis, understatement and omission of substantial costs, validity of the assessment of the most reasonable firm resources[74] and analytical support for specific combustion turbine resources included in the Action Plans, are mostly uncontested and in no case substantially rebutted.

2.

Ranking or Prioritizing Final Resource Plans

In its Decision and Order establishing the current IRP Framework,[75] the commission addressed concerns regarding the "transparency related to a utility's decision-making toward the selection of the priorities and elements of an Action Plan".[76]

> In balancing the various interests, the commission finds that there should be some understanding of how the utility developed the Action Plan. Ranking of resource plans is a mechanism that affords some transparency to the process while minimizing the "Black Box" concern.[77]

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[74]The HECO Companies provide some discussion of the selection of firm resources in HECO SOP at 54-57 but this discussion does not address the IE's conclusions in the Final Certification at 13, regarding the validity of any determination of the most economical and appropriate firm generation resources for the utility systems.

[75]Decision and Order, March 14, 2011, Docket No. 2009-0108.

[76]Id. at 76.

[77]Id. at 76-77.

Accordingly, the Framework includes requirements regarding the determination of Resource Plans as a discrete step in the IRP Process.

> 9. Determination of Resource Plans.
>
> The utility shall rank or descriptively prioritize the final Resource Plans (i. e., preferred plan, secondary plan, parallel plan, contingency plan) based upon such criteria as it may establish with the advice of its Advisory Group.[78]

The IE concludes in the Final Certification that this process step was entirely omitted, stating "[t]he IRP Report does not refer to, explain or discuss any ranking or prioritization of the final resource plans. No criteria or explanations are provided regarding the selection of the final resource plans. There was no discussion with or advice provided by the Advisory Group regarding criteria, definitions or the meaning of designation, ranking or prioritization of the final resource plans."[79]

The HECO Companies respond to the IE's conclusion in the HECO SOP as follows:

> In accordance with the IRP Framework, the Companies descriptively prioritized "final resource plans" for Oahu, Maui, Lanai, Molokai, and Hawaii islands. The final resource plans represent a range of plausible circumstances that could unfold in Hawaii over the next twenty years. The final resource

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[78]Framework § V.C.9.

[79]Final Certification at 36; See also Final Certification Summary of Findings at 5, 7-8.

> plans developed for each island in the Hawaiian electric Companies' service territories were constructed to show different 20-year resource plans that include the major elements included in the Action Plans. None of the final resource plans were intended to represent the preferred course of action for the Companies, nor does any one of the final resource plans include the only combination of resources that are included in the Action Plans. Rather, the final resource plans collectively reflect the range of options considered in the Action Plans.[80]

The commission is not convinced by the Companies' explanations above or anywhere else in the record in this docket that the Companies complied with the Framework requirement to rank or descriptively prioritize final Resource Plans. The IRP Report includes no evidence of ranking or prioritization and does not even provide any discussion or definitions that would provide functional distinctions between the four different types of final resource plans. It is clear in the record and uncontested by the Companies that no discussion was made and no criteria were established with the advice of the Advisory Group.

The commission therefore finds that the IRP process and IRP Report are not compliant or consistent with the Framework requirements in section V.C.9.

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[80]HECO SOP at 36, 57-58.

3.

Determination of Action Plans

One clear purpose of the IRP process is the development of Action Plans that identify resources and actions for a five-year future time frame to meet the IRP planning objectives in light of uncertainties.[81] In addition to provisions requiring meaningful analytical support,[82] several provisions in the Framework provide for transparency in the planning steps and analysis that ultimately lead to the determination of the Action Plans.

For example, the Framework requires that planning objectives are clearly identified with input from the Advisory Group at the outset of the IRP process[83] and that these objectives must be used to "provide guidance or the basis for decision-making throughout the IRP process."[84] To the extent practicable, the IRP Report is required to summarize how the planning objectives are used throughout the process.[85] As discussed

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[81] See generally Framework § II; Framework § V.C.10.

[82] Framework § V.B.2 ("Analysis supporting the Integrated Resource Planning Report shall: provide meaningful support for the reasonableness of the Action Plan….").

[83] Framework § V.C.4.a.

[84] Id.

[85] Id.

in the previous section of this Decision and Order, the determination of the final Resource Plans must include ranking or prioritization based on explicit criteria in order to, amongst other purposes, provide transparency in the development of the Action Plans.

Early in the IRP process, the HECO Companies developed planning objectives with the participation and incorporating input from the Advisory Group. It is not evident, however, how or whether the planning objectives were used in the determination of the final Resource Plans or the determination of the Action Plans. As stated by the IE:

> One substantial shortcoming in the HECO Companies' IRP process is ambiguity regarding how the Action Plans were developed based on the analyses of the resource plans or planning objectives developed and presented earlier in the process.
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> Each of the Action Plans is founded upon four final resource plans, including a preferred plan, a contingency plan, a parallel plan and a secondary plan. There is no discussion of how these final resource plans were selected, whether or how the planning objectives were used, whether any methodical process was used for determination, or what each of the plan designations means.[86]

[86]Final Certification at 23-24 (footnote omitted).

The commission finds that the HECO Companies' determination of the Action Plans lacked transparency and was not conducted in an open manner as was intended by the Framework.

The Framework also requires that:

> [t]he utility shall review the Resource Plans to identify common themes, resources, programs, and actions that demonstrate robust value to balance costs and risks, and provide the greatest value and flexibility across as many of the evaluated Scenarios and Resource Plans as reasonably practicable.[87]

This provision could be characterized as the very crux of the scenario planning concept, as explained by the Companies to the Advisory Group throughout the IRP process. Yet there is no discussion or analysis in the IRP Report that makes it clear how or whether this fundamental review was undertaken. There is no evident discussion or analysis that demonstrates that the final Resource Plans or the Action Plans provide "the greatest value and flexibility" or that such a determination was ever methodically made or attempted "across" the various evaluated scenarios. The commission notes that in many cases only one of the four selected scenarios was used in the analysis of the final resource plans, and the Action Plans themselves (for all utilities and all islands) are documented with respect to only one of the scenarios.

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[87]Framework § V.C.10.b.

Furthermore, the Action Plans appear to be focused on preserving "flexibility" as the single predominant objective without respect to "value". As clarified by the HECO Companies:

> None of the final plans by themselves were intended to indicate a single course of action for the Companies nor the only set of resources that are being pursued in the Action Plans, but rather collectively reflect the range of options included in the Action Plans. The Action Plans were developed with resources from the preferred, parallel, contingency, and secondary plans. Due to the complexity and interdependency of items in the Action Plans, coupled with the uncertainty in planning for the future, actions from any of the four plans may be pursued concurrently in order to ensure that the Hawaiian electric Companies will always be able to meet their obligation to serve, RPS, and evolving public policy objectives.[88]

This approach places primary emphasis on including all identified options from all of the final Resource Plans in the Action Plans in order to preserve flexibility to meet all possible circumstances in all of the evaluated scenarios. Such an inclusive approach, however, does not consider "value" in the meaning of the Framework provision V.C.10.b. cited above. According to the IE:

> It is not clear that the Action Plans provide substantial value in providing context and framing for later incremental decisions, based on the best and current available information. The Action Plans do not identify how, when or by what criteria decisions between the possible alternate preferred,

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[88]HECO SOP at 58.

> contingency, parallel or secondary plans will be made.[89]

DBEDT states similar concerns regarding the unrestricted inclusiveness of the Action Plan:

> To the extent that the HECO Companies suggest that they should be able to pursue any path they desire from any of the plans because separate processes will occur, DBEDT disagrees. The purpose of engaging in an IRP process and creating Action Plans is to ensure, based on a holistic review, that a utility will take actions that will meet energy objectives and energy needs consistent with State energy policies and goals, while meeting the needs of the public and the HECO Companies. The HECO Companies' position reflects a deflection of their responsibilities by placing the onus on the Commission and parties to understand how various separate actions undertaken by the utilities would work.[90]

The HECO Companies provide flowcharts in Appendix Q of the IRP Report to illustrate the complexity and interdependency of the Action Plans.[91] In cryptic form, the flowcharts in Appendix Q provide some perspective regarding how the resources and actions identified in the different final Resource Plans might relate to one another. This does not, however, constitute a clear or methodical determination of when, how or by what criteria decisions between alternate Action Plan elements would be determined or how

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[89]Final Certification at 7.

[90]DBEDT RSOP at 5 (footnotes omitted).

[91]HECO SOP at 59.

long expenditures on multiple, parallel, or other eventually potentially redundant measures would have to be maintained. As stated by the Consumer Advocate:

> the flow diagrams in Appendix Q did not provide key decision points in the process that would indicate when and why the utility might move from one resource option to another resource in a different plan. For example, liquefied natural gas ("LNG") is an integral part of the HECO Companies' Action Plan. However, there are a great number of uncertainties with LNG (e.g., infrastructure cost, import terminal siting, pricing, environmental concerns, etc.). It is not clear from the HECO Companies' Final Report and Appendix Q when key decision-making points would occur that may result in abandoning LNG as a resource option.
>
> At a minimum, the HECO Companies need to clearly establish the criteria for the preferred, parallel, secondary, and contingent resource plans.[92]

After review of the record, the commission finds that the HECO Companies did not sufficiently demonstrate how Resource Plans were evaluated to "balance costs and risks" and "provide the greatest value" across the different scenarios, as required by the Framework. The commission also finds that, aside from other concerns regarding the process and analyses used to develop the Action Plans, the ambiguities regarding what criteria would pertain to implementing alternate Resource Plans or Action Plan elements or how any selection of the multiple redundant Action

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[92]Consumer Advocate SOP at 12.

Plan elements would be determined renders the Action Plans too irresolute to meaningfully inform subsequent commission decisions. The commission concurs with the IE's general conclusion that "[t]he Action Plans (and the IRP Report more generally) do not present an overall well-analyzed, robust course of action based on clearly laid out supporting plans and alternate plans."[93] The commission therefore determines that the IRP Report is not compliant with Framework provision V.C.10.b.

4.

Advisory Group Process

A principal feature of the IRP process is the participation of an Advisory Group in the execution and formulation of the utility IRP Report and Action Plans. The purpose of the Advisory Group is:

> to provide the Hawaiian Electric Companies with the benefit of community perspectives by participating in the utility's integrated resource planning process and representing diverse community, environmental, social, political, or cultural interests consistent with the Revised Framework goal. The Advisory Group represents interests that are affected by the Hawaiian Electric Companies' resource plans and possesses the ability to provide

[93]Final Certification at 64.

significant perspective or useful expertise in the development of the resource plans. [94]

Several Advisory Group members and parties to this docket assert that the HECO Companies were insufficiently diligent in responding to input provided by the Advisory Group at various stages of the IRP process.[95]

In response to the IE's conclusions, the HECO Companies acknowledge that "there is always room for improvement in being responsive to comments"[96] but otherwise maintain that the Companies considered the comments and suggestions of the Advisory Group consistent with the provisions of the Framework.[97] The Companies cite examples of instances where input from the Advisory Group was incorporated in the IRP Report,[98] clarify that the Companies provided supporting data and analyses to the Advisory Group as requested,[99] and held public meetings on each of the affected

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[94]Docket No. 2012-0036, Order No. 3051 filed on June 29, 2012 at 2-3 (footnote omitted).

[95]See e.g., CA SOP at 6; COH SOP at 3; SC SOP at 3-4; Sally Kaye July AG Comments at 1; DBEDT July AG Comments at 2; BPF July AG Comments at 8; Earthjustice July AG Comments at 2.

[96]HECO SOP at 34.

[97]Id. at 35.

[98]Id. at 18-19.

[99]Id. at 19.

islands to increase awareness of the IRP process and solicit input from the public.[100]

The Companies explicitly contest the IE's statement that "the Companies have ultimately ignored much of the input, comment and suggestions provided by the Advisory Group members" claiming that "the Companies considered the comments and suggestions of the Advisory Group and the IE during the execution of the IRP process."[101] As noted by the IE, if the word "considered" is interpreted to merely infer perfunctory contemplation, the Companies' claim could perhaps be credible.[102] It is clear from the record, however, that the Companies have not, in fact, incorporated or provided evident responses to several substantial comments and suggestions made by Advisory Group members and the IE. It should go without saying that Advisory Group members deserve (1) sufficient oral or written acknowledgement from the utility to know that any offered input has been received or heard and is understood by the utility and (2) sufficient oral or written response to understand the extent to which the input is being incorporated or, if not being incorporated, whether and why the utility disagrees with the input. Consistent with the Framework

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[100] Id.

[101] Id.

[102] See Final Certification at 25-26.

provision, the utility shall consider the input of the Advisory Group members, but is not bound to follow the recommendations of the Advisory Group members.[103]

The HECO Companies also contest the IE's statement that "Advisory Group comments at meetings often appeared to be greeted with dismissive argument, without acknowledgement of the comments' merit or substance".[104] The Companies point out that time was allotted at each meeting for questions and comments, the Companies' subject matter experts were available at the meetings to respond and the lengthy technical sessions were provided to provide for responses.[105] The commission acknowledges the time and opportunity provided for comments and availability of subject matter experts provided by the Companies. Based on direct observations by the commission, however, the commission concurs with the IE's statement to the extent that it constructively identifies a considerable opportunity and need for improvement in how the utility comports itself in responding to Advisory Group input. The commission stresses that the utilities have a responsibility to show professional respect and courtesy to the Advisory Group

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[103]See Framework § III.F.3.

[104]HECO SOP at 19.

[105]HECO SOP at 19-20.

members who are recognized by and serve at the request of the commission.

In addition to the general Framework provisions regarding the Advisory Group process discussed above, the Framework requires that in several specific matters, input must be incorporated from the Advisory Group. As discussed above, in the Final Certification the IE asserts that

> [t]here was no opportunity for Advisory Group input regarding the determination of the final resource plans or the formulation of the Action Plans. The final resource plans and Action Plans were presented for the first time in the final IRP Report.[106]
>
> The HECO Companies did not determine, rank or prioritize final resource plans based on any clear or identified criteria. Criteria were not determined with input from the Advisory Group as required by the Framework.[107]
>
> The HECO Companies did not enlist the participation of the Advisory Group in determining meaningful methods to measure or present rate impacts (as required).[108]
>
> The Companies did not enlist input from the Advisory Group to consider whether the IRP Report and Action Plans result in affordable energy service (as required).[109]
>
> Resource options were not screened (as required) based on any of the specific screening criteria identified in the Framework

[106]Final Certification at 5.

[107]Final Certification at 5.

[108]Final Certification at 6.

[109]Final Certification at 6.

> or according to other criteria established with input of the advisory group.[110]

(Footnotes retained from original).

The Companies do not contest the IE's conclusions that there was no opportunity for Advisory Group input regarding the determination of the final resource plans or the formulation of the Action Plans;[111] that the final plans were not prioritized based on criteria and that no such criteria were developed with the Advisory Group;[112] and that input from the Advisory Group regarding the affordability of energy service was not explicitly enlisted.[113] The HECO Companies acknowledge that these subjects were initially presented in the final IRP Report which was issued without Advisory Group review.[114]

In response to the IE's conclusion that resource options were not screened based on criteria provided in the Framework and other criteria established with input from the Advisory Group, the HECO Companies identify three meetings at which resource

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[110]Final Certification at 8; Id. at 32 (discussing compliance with Framework section V.C.6.d. which states: "The utility has not conducted any screening process that is discernable or consistent with this Framework provision. No screening criteria have been discussed or established with input from the Advisory Group.").

[111]HECO SOP at 17-18.

[112]HECO SOP at 18.

[113]HECO SOP at 17.

[114]HECO SOP at 17.

options were discussed but do not contest the conclusion that criteria were not used or developed with the Advisory Group as required.[115]

The Companies do explicitly contest the IE's assertion that the Companies did not enlist the participation of the Advisory Group in determining meaningful methods to measure or present rate impacts, clarifying that Advisory Group had many opportunities to provide input on determining meaningful methods to measure or present rate impacts.[116] Regarding this specific conclusion, the commission does not agree with the IE, noting the numerous opportunities made available to the Advisory Group and the IE and the incorporation of input received.[117]

Finally, the commission observes that several ultimate shortcomings in the IRP Report were identified by Advisory Group members and the IE early in the IRP process but went unheeded by the Companies. Examples include comments by the Advisory Group and the IE regarding including analysis of several resource options ultimately omitted contrary to the Framework and commission Orders, provision of an appropriately framed base case scenario, utilization of appropriate modeling tools, inclusion and modeling

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[115]HECO SOP at 37.

[116]HECO SOP at 16.

[117]Id.

of ancillary services and associated costs, and the need to prioritize final resource plans with Advisory Group input. As noted by the Consumer Advocate and others, the amount of analysis and work that was left until too late in the process to allow complete analysis and opportunity for sufficient review by the Advisory Group and IE.[118] This issue was identified and clearly stated in the IE's First Quarterly Report, filed October 22, 2012:

> Analysis of the Action Plans is scheduled to occur in the later parts of the IRP process. The issue of appropriate allotment of time to the various aspects of the IRP analyses, however, is important to consider throughout the process.
>
> One concern noted by the IE very early in the process, during the initial discussion of the IRP process schedule prior to the appointment of the IRPAG, was the limited amount of time and lack of any specifically identified process steps dedicated to any analysis of the Action Plans. The HECO Companies took a strong position during discussions of the IRP process schedule, that the development of the Action Plans will be straightforward and will not require extensive time or analysis steps. The IE did not agree that this would necessarily be the case. By agreement, language was inserted in the IRP schedule submitted by HECO that clarifies that, the dates in the schedule and the number of Advisory Group meetings are tentative estimates that may need to be adjusted based on developing circumstances, including for example, the nature of the then-later-to-be-identified principal issues.
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[118]See Consumer Advocate's July AG Comments at 2; Final Certification at 16-17.

> The IRP process schedule provides several months to further consider the extent of time and analysis that will ultimately be required to provide meaningful support for the determination of an Action Plan. The current schedule, however, does not identify ample time or any specific process steps to conduct analysis or provide IRPAG review of the development of the Action Plan.[119]

Aside from requirements to comply with the minimal standards provided in the Framework regarding consideration of input in the Advisory Group process, the commission notes that the utilities could have benefited substantially by more careful consideration of some good and timely advice that was provided early in and throughout the IRP process.

D.

Issue #2: Principal Issues and Questions

The second of three general issues established by Order No. 31443 in this proceeding is:

> 2. Whether the IRP Report meaningfully addresses the Principal Issues identified in the IRP process, including the questions and issues identified by the commission by Order No. 30534.

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[119] *First Quarterly Report on the Status and Evaluation of the HECO/MECO/HELCO IRP Process*, filed October 22, 2012 at 15-16.

Early in the IRP process the commission explicitly and deliberately identified several issues as key questions that were necessary to be addressed in order to prepare adequate Action Plans. After review, the commission finds that the HECO Companies did not sufficiently and meaningfully address the identified Principal Issues, as further discussed below.

The Framework requires the utility, with input from the Advisory Group, to identify "Principal Issues" that serve, along with identified planning objectives, to provide focus for the IRP process and serve as a standard for providing meaningful analysis in support of the Action Plans.[120] The Framework explicitly provides an opportunity for the Commission to identify, at the beginning of each planning cycle, "questions and issues that the specific round of planning analysis and the resulting plans and Action Plans should address."[121]

In Order No. 30534 the commission specified Principal Issues that must be addressed in the HECO Companies' IRP process. With input from the Advisory Group, the Companies identify a list of issues that include the Principal Issues[122] in Chapter 4 of

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[120]Framework § V.C.1.a; See also, Framework § V.C.8.b (requiring sufficient analyses to address identified issues).

[121]Framework § V.C.1.b.

[122]As summarized in the Final Certification:

> "[t]he content of the companies' Chapter 4 is derived primarily from the language in the

the IRP Report, and present analysis of these issues in Chapters 8 - 16.[123]

The IE, in the Final Certification, includes a critical review of whether the IRP Report addresses the identified Principal Issues, including a summary of conclusions[124] and a detailed discussion regarding each principal issue.[125] The IE concludes that the IRP Report does not sufficiently address several of the Principal Issues.

In Order No. 31443 the commission noted the conclusions reached by the IE in the Final Certification and directed the parties and participant in this docket to address the IE's conclusions, including those regarding the Principal Issues, in the parties' SOP's. As noted above, with the exception of the

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> Commission's Order Identifying Issues and Questions.. Although the formatting and text differs, there appear to be no intentional differences in meaning between the Principal Issues identified by the Companies and the Order Identifying Issues and [Questions]. Where there may be incidental differences in meaning it is mutually understood, based on clarification at several Advisory Group meetings, that the meaning in the Commission's Order will be applied." Final Certification at 38.

[123]Additional discussion of the principal issues is provided in the Appendices and throughout the IRP Report.

[124]Final Certification at 6-7.

[125]Final Certification at 38-65.

HECO Companies, none of the parties take issue with or contest the conclusions in the Final Certification. The HECO Companies' SOP and RSOP provide responses to at least some but not all aspects of each of the conclusions in the Final Certification Summary of Findings and the July AG Comments.[126]

The commission has examined the responses provided in the parties' and participant's SOP's and RSOP's in compliance with Order No. 31443. As indicated above, the commission finds the specific conclusions in the Final Certification, with only one exception,[127] to be well founded and accurate. In particular, regarding whether the IRP Report meaningfully addresses the Principal Issues, the commission concurs with the conclusions made by the IE in the Final Certification regarding several specific principal issues:

Principal Issue
Energy Storage Analyses of potential energy storage technologies, including BESS resources, failed to address certain key aspects and capabilities of these systems. The economic analyses of the BESS resources did not measure the fundamental benefits these resources are primarily being considered to provide. (Final Certification at 39-40)
Best Use of HECO CIP CT-1 Generating Facility Insufficient analysis of the benefits and effects of using the CT-1 unit for the maximum integration of renewables. The IRP Report does not include discussion or meaningful analysis of how a change of the operation of the CT-1 unit from a single cycle expensive-to-run peaking

[126]See HECO SOP §§ II-IV.

[127]As discussed above, the commission does not accept the IE's conclusion that "[t]he HECO companies did not enlist the participation of the Advisory Group in determining meaningful methods to measure or present rate impacts." See Final Certification at 6.

unit to an efficient combined cycle unit would affect the operation of the utility system. (Final Certification at 40-41)
Reasonable Cost and Rate Impacts The HECO Companies did not enlist the participation of the Advisory Group in determining whether the IRP Report and Action Plans result in affordable energy service. Rate impact estimates were flawed and unreliable. (Final Certification at 42-47)
RPS Rate Impact IRP Report findings regarding the economics and rate impacts of attaining the RPS are deficient because certain assumptions have not been verified. The strength of the RPS rate impact analysis would be improved by addressing (or at least identifying and discussing) each of the uncertain presumptions. (Final Certification at 47-49)
EEPS Rate Impact Analyses of energy efficiency program implementation lacked depth. A more meaningful test of the costs and rate impacts that result from various levels of energy efficiency implementation should be based on resource plans or strategies that more closely resemble the expected economics and mix of resources targeted in the Action Plans. There does not seem to be any mention in the Action Plans or elsewhere in the IRP Report of considering actions to investigate and utilize feasible and cost-effective geographically targeted energy efficiency and load management opportunities. (Final Certification at 49-51)
Captive Customer Rate Impact The seriousness of potential rate impacts to customers without self-generation or extensive energy efficiency opportunities under non-ideal utility system planning or economic circumstances has not been meaningfully measured. The analyses presented appear to underplay rather than squarely examine this Principal Issue. (Final Certification at 51-53)
Inter-Island & Inter-Utility System Transmission The HECO Companies' analyses of inter-island and inter-utility transmission systems lack depth and does not fully address the questions posed in this Principal Issue. Addressing this Principal Issue requires some examination of whether it is feasible to site and implement extensive amounts of renewable energy resources on the Island of Oahu. However, the IRP Report does not provide any probative discussion or address this question explicitly. In addition, cost and benefits of inter-island transmission are not credible or meaningful. (Final Certification at 53-57)
Smart Grid Implementation The IRP Report does not include thorough analysis of the comparative costs and benefits of whether adoption of a smart grid or smart meters should be completed by the Companies. The IRP Report includes descriptions of potential smart grid benefits but does not identify corresponding costs. The full scope of the issues regarding this Principal Issue has not been addressed and credible assessment of smart grid implementation is not presented. (Final Certification at 57-58)
Strategies for Handling Environmental Regulations The IRP Report is minimally compliant regarding this Principal Issue, although further analysis is required as to such areas as unit retirement economics, logistics, and effect of contingencies. (Final Certification at 58-59)
Fuel Supply and Infrastructure The costs of fuel supply and infrastructure appear to be included and considered in the analyses of the resource plans, however,

the IRP Report does not include analysis regarding effects of significant changes in output of Hawaii's fuel refineries. It is not clear and not discussed whether the ranges of fuel price projections assumed in the analyses encompass the full range of possible changes in fuel supply pricing. (Final Certification at 59-60)
Fossil Fuel Generation Resources The analyses are insufficient and require more complete and thorough examination. The role and functioning of utility generation units in the later years of the planning period in the final resource plans is not sufficiently considered or determined. Consideration of the retirement, deactivation or replacement of existing generation units requires further investigation. (Final Certification at 60-61)
Essential Grid Ancillary Services The HECO Companies have not provided the analysis of comparative costs and benefits required in this Principal Issue. The IRP Report fails to address the need to "accommodate expected increasing proportions of variable and/or intermittent renewable generation resources." The essential grid ancillary services needed to accommodate the expected amount of variable renewable generation in the final resource plans and how these services will be provided have not been identified, quantified or accounted for in costs. Consequently, the feasibility the final resource plans has not been demonstrated and the costs are underestimated. The IRP Report fails to address these critical issues and additional analysis is required. (Final Certification at 61-63)
Transmission Systems The IRP Report does not include a comparative analysis of the costs and benefits of adding to or modifying existing transmission and distribution systems. The analyses do not address needs or costs to interconnect new renewable generation resources assumed to be implemented in the final resource plans. There does not appear to be consideration of the extent to which fossil generation might have to operate due to lack of transmission or distribution capacity or other constraints while solar or wind resources are curtailed. (Final Certification at 63-64)

The IRP Report clearly does not provide the information or analysis required in Order No. 30534.

Feasibility and Cost of Incorporating Renewable Resources

The Final Certification identifies several shortcomings in the analyses supporting the conclusions of the IRP Report and Action Plans. The Final Certification general conclusion #1 (as numbered in the HECO SOP at 11-38) states that several

conclusions in the IRP Report are based on presumptions that are not supported by analysis or probative examination in the IRP Report. Three specific conclusions are summarized:

- It has not been demonstrated that the extensive amounts of variable renewable generation assumed in the final resource plans can be accommodated on the utility systems reliably, without substantial curtailment and without substantial (and currently unaccounted) costs.

- It has not been demonstrated that the extensive amounts of assumed distributed renewable generation assumed in the final resource plans can be interconnected with the utility distribution systems reliably and without substantial (and currently unaccounted) cost.

- It is not clear and it is not addressed whether the extensive amounts of economical renewable generation resources assumed on the HECO system can be sited on the Island of Oahu restricted only by utility system economic criteria.[128]

The Final Certification provides extended discussion of these conclusions.[129] In summary the IE states that:

> Although it is possible that the assumed amounts of renewable generation might ultimately be sited and feasibly incorporated in the utility systems as presumed, this is far from certain and is subject to reasonable doubt. It is certain, however, that in order to site and accommodate the assumed amounts of renewable generation without substantial

[128]Final Certification at 4-5.

[129]Final Certification at 9-15.

> curtailment, substantial system operation and infrastructure improvements would be necessary that are yet unidentified and would incur costs that are not accounted for in the final resource plans or projections of rate impacts in the IRP Report. In this respect, the costs and rate impacts associated with the final resource plans and Action Plans are understated.[130]

Required Comparative Analyses

Several of the Principal Issues identify analysis of the comparative costs and benefits of specific considerations that are necessary to provide meaningful support of the Action Plans. These include Principal Issues Nos. 14, 15 and 16: analysis of inter-island and inter-utility system transmission connections across multiple islands; smart grid implementation, and strategies for handling environmental regulations. Several shortcomings in the analyses required to address these Principal Issues are identified by the parties, Advisory Group members and the IE.

The HECO Companies' analysis of inter-island transmission connection is presented in Chapter 11 of the IRP Report. Several interconnection configurations were analyzed including interconnection of Oahu and Hawaii Islands, Oahu and Maui Islands, and Oahu and a Lanai Wind resource.

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[130]Final Certification at 9.

The Final Certification concludes that the HECO Companies' analyses of inter-island and inter-utility transmission connections have several identified limitations, should be considered only rough preliminary screening efforts and any conclusions based on the analyses should be considered indeterminate until verified by more appropriate analysis.[131] The HECO Companies acknowledge that more detailed studies are required along with better estimates of the undersea cable cost components.[132]

The HECO Companies' analysis of smart grid implementation is presented in Chapter 12 of the IRP Report. The Companies identify past, current and planned smart grid program activities and identify efforts to estimate costs and benefits.

The Final Certification concludes that the IRP Report includes discussion of smart grid benefits and cites several previous studies and studies for other utility systems but does not provide the comparative analysis of costs and benefits required by the Principal Issue.[133] The HECO Companies acknowledge the IE's conclusion in the Final Certification and state that the IRP smart grid analysis is not complete.[134]

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[131]Final Certification at 53-57.

[132]HECO SOP at 25-26.

[133]Final Certification at 57-58.

[134]HECO SOP at 27.

The HECO Companies' analysis of strategies to comply with environmental regulations is presented in Chapter 9 of the IRP Report and is incorporated in the analyses of Resource Plans for each of the Companies with respect to the four identified planning scenarios.

The Final Certification concludes that the HECO Companies have provided meaningful analysis of strategies to comply with environmental air quality regulations but that further analysis is required to consider generation unit retirement options.[135] In its July AG Comments, the Consumer Advocate presents analysis of generation unit retirement options and concludes that the HECO Companies have not sufficiently considered generation resource retirement strategies other than two extreme cases: minimal retirements and extensive retirements.[136] The U.S. Environmental Protection Agency (EPA) recommends that further information be provided regarding the analysis of environmental compliance options:

> EPA's April 22, 2013 letter to the IRP recommends that the Companies identify the costs associated with the full range of environmental compliance options. The final IRP report comments on a broader range of environmental compliance costs, but EPA believes the public would benefit from a clearer and more robust comparison of the cost

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[135]Final Certification at 28.

[136]CA July AG Comments at 9-12.

> of the full range of environmental compliance options, including installing air quality control equipment, fuel switching and renewables. The final report is unclear about how each of the different compliance options compare on the basis of up-front capital cost, as well as annual and long term operation and maintenance costs.[137]

The HECO Companies' SOP and RSOP do not respond explicitly to the conclusions in the Final Certification or the Advisory Group comments cited above regarding analysis of environmental compliance strategies.

Analysis of Cost and Rate Impacts

In Order No. 30534, the commission clearly identified the affordability of utility-provided energy services as a primary concern and objective. In addition to the issue of reasonable cost and rate impacts generally, the commission identified rate impacts associated with attaining the Renewable Portfolio Standard (RPS) and the Energy Efficiency Portfolio Standard (EEPS) as specific Principal Issues. The commission also required consideration of potential rate impacts on customers not participating in customer-sited generation or energy efficiency measures (captive customers) if utility costs might increase in conjunction with decreases in utility sales. The commission required

[137]EPA July AG Comments at 1.

consideration of circumstances that could compound to result in high utility fixed costs and/or low system sales and evaluation of the extent to which such circumstances could lead to unreasonably high rate impacts on captive customers and possible accelerated customer exit or self-generation.

The HECO Companies provided information regarding the costs and rate impacts associated with each of the Resource Plans and the Action Plans in Chapter 8 and Chapter 19 of the IRP Report respectively. Additional information is provided in Appendix P of the IRP Report.

Several conclusions in the Final Certification identify shortcomings in the analyses of the costs and rate impacts associated with the Resource Plans and Action Plans and the consideration of several Principal Issues that address the costs and rate impacts associated with the RPS, EEPS, captive customers and customer exit possibilities. The IE concludes that the rate and bill impacts of the Resource Plans and Action Plans presented in the IRP Report are underestimated and de-emphasized;[138] several components of costs are omitted or underestimated, including the costs of incorporating distributed generation and the ancillary costs associated with incorporating

[138]Final Certification at 42-47.

large amounts of variable renewable generation;[139] the costs and rate impacts associated with attaining the RPS are not meaningfully determined;[140] and the consideration of potential EEPS impacts is rudimentary.[141] The IE concludes that concerns regarding rate impacts on captive customers and compounding circumstances that could result in high rates and customer exit were not meaningfully addressed.[142]

The Consumer Advocate identifies shortcomings in the analyses of the costs of attaining the RPS;[143] concludes that expected costs associated with greenhouse gas regulation are not appropriately escalated and are underestimated;[144] and expresses concern that energy efficiency strategies that are shown to be cost effective are not more fully investigated.[145] The Consumer Advocate also maintains that the HECO Companies Resource Plans do not consider more reasonable generation plant retirement and deactivation strategies[146] and do not sufficiently consider

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[139]Final Certification at 11-13, 61-63.

[140]Final Certification at 47-49.

[141]Final Certification at 49-51.

[142]Final Certification at 51-53.

[143]CA July AG Comments at 6-8.

[144]CA July AG Comments at 3-5.

[145]CA July AG Comments at 13-14.

[146]CA July AG Comments at 9-12.

uncertainties or alternative plans regarding future circumstances without availability of LNG.[147]

The HECO Companies respond to the conclusions and concerns by the IE and Consumer Advocate, stating that the analyses of rates and bills are intended to provide a general sense of direction and magnitude[148] and take into consideration input from the IE and Advisory Group.[149] The Companies describe the analyses of rate impacts of attainment of the RPS,[150] and EEPS.[151] The HECO Companies describe the analysis of captive customer rate impacts and system exit possibilities as providing analysis of rate impacts associated with four scenarios having differing sales forecasts and capital investment programs, analysis of rate impacts resulting from decreased sales, and analysis of customer exit possibility using an analysis of bill impacts for a customer using LNG fuel cells.[152]

SC and the Consumer Advocate further observe that the AES coal generation unit is assumed to continue operation throughout the planning analyses for the Resource Plans and Action

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[147]CA July AG Comments at 14-16.

[148]HECO SOP at 15-16.

[149]HECO SOP at 16-17.

[150]IRP Report at 8/62 to 8/102.

[151]HECO SOP at 29-32; IRP Report at 8/50-61.

[152]HECO SOP at 21-23; IRP Report at 19/45-54.

Plans on the HECO system.[153] The impacts of the AES unit on system operation flexibility (as a baseload unit), cost effectiveness and contributor to greenhouse gas emissions are significant considerations that are not discussed or analyzed in the IRP Report.

The commission finds that the HECO Companies have not sufficiently addressed issues regarding the affordability of utility-provided energy services that were clearly identified by the commission at the outset of the IRP process in Order No. 30534. The commission first notes that it is concerned regarding the magnitude of the rate impacts of all of the final Resource Plans, and especially, as pointed out by the Consumer Advocate, the high costs of the Resource Plans that do not benefit from the fuel cost reductions associated with the assumed but uncertain availability of LNG in later years of the planning period. Regarding the merits of the analyses, the commission is concerned that the costs and rate impacts of the Resource Plans and Action Plans appear to be methodically underestimated. Several factors are identified by the IE and parties that are not adequately considered in the HECO Companies' analyses, including failure of the analyses to include or fully include costs of incorporating distributed generation resources and variable renewable generation resources;

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[153]SC SOP at 11-12; CA July AG Comments at 19.

expected implementation and escalation of carbon emissions fees; and the costs of environmental compliance by independent power producers. The commission also notes that the low operational costs of the AES coal resource appear to be presumed throughout the planning period in all of the scenarios, final Resource Plans and Action Plan rate impact analyses even though this is not a certainty.

The commission is not convinced that the analyses of the attainment of various levels of the RPS are meaningful, in light of the issues raised by the Consumer Advocate and the problems identified with the modeling analyses and unexamined assumptions regarding the feasibility and costs of siting and incorporating the assumed amounts of renewable energy resources. The commission is also concerned that the results of the analyses indicating that the maximum amounts of energy efficiency implementation resulted in the lowest cost plans was not followed up with further analysis of more intensive energy efficiency implementation as suggested by the Consumer Advocate. The commission remains concerned regarding rate impacts on captive customers, the potential compounding of circumstances that could result in high utility fixed costs and decreasing sales and the resulting possibility of customers exiting the utility system.

E.

Issue #3: Approval, Rejection or Modification of the IRP Report

The third of three general issues established by Order No. 31443 in this proceeding is:

> 3. Whether the commission should approve, reject, either in whole or in part, or require modifications of the submitted IRP Report, including Scenarios, Resource Plans, or Action Plans.[154]

Upon review, the commission cannot approve the IRP Report or the Action Plans included in the IRP Report. In several respects that are not possible to overlook, the IRP process was not conducted consistent with the IRP Framework. The Action Plans and the final Resource Plans were not developed with sufficient transparency or evident supporting analysis to determine how or whether they are preferred courses of action or provide the "greatest value and flexibility" as reasonably practicable. At the outset of this IRP process the commission identified issues and questions to be addressed by the utility in conducting its analysis and determining the resulting Action Plans. Issues which were of fundamental importance to the commission included the affordability of utility services; the economics of achievement of the RPS and EEPS; analysis of

[154]Order No. 31443 at 13.

the feasibility, costs and alternatives to provide ancillary services necessary for the accommodation of both distributed and utility-scale renewable generation; and determination of the merits of inter-island and inter-utility power transmission.

Many of the identified flaws in the IRP Report are rooted in decisions and analysis made by the HECO Companies early in the process. The flaws are substantial and fundamental in nature, thus making it difficult to address promptly in this review proceeding. Examples include (1) the selection of the Strategist model as the sole basis for conducting analysis of the resource plans and Principal Issues and failure to procure or prepare other analysis tools as necessary and appropriate, (2) failure to provide required evaluation of several resource options and measures (e.g., pumped storage, distributed generation, smart grid, among others) in the analysis of resource plans, and (3) failure to consider the operational impacts, costs and necessary ancillary services required to accommodate substantial amounts of variable renewable generation on the utility systems. These fundamental shortcomings in the IRP Report are fatal and it is not reasonable or appropriate in the current review phase of the IRP process to conduct further analysis. Further identified flaws include omission of several required planning process elements that require participation of the Advisory Group,

including steps to (4) establish criteria, with Advisory Group input, for screening resource options[155] and (5) rank or descriptively prioritize final Resource Plans based upon such criteria as may be established with the advice of the Advisory Group.[156]

Furthermore, the Action Plans proposed in the IRP Report would not serve any of the purposes identified in the Framework effectively.[157] The proposed Action Plans do not provide any reasonably supported context, guidance or confidence useful for making regulatory or resource acquisition decisions. As discussed in sections above, the IRP Report does not provide sufficient meaningful analysis to support the Action Plans or to make a reasonable assessment of the costs, rates or affordability of the Action Plans. The Action Plans are as ambiguous as they are flexible or useful; it is not possible to determine whether any contemplated actions are outside the scope of what could be considered consistent with the Action Plans or what determining criteria are presumed to be relevant. From the broadest perspective, the commission is left without credible analysis or guidance regarding how the Companies will successfully address the

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[155]Framework § V.B.6.d.

[156]Framework § V.C.9.

[157]See Framework § II.A.

substantial challenges in the next few years to provide reliable power at reasonable costs with an evolving resource mix and declining sales. Accordingly, the commission rejects the IRP Report and the included Action Plans of each of the HECO Companies.

The commission is certainly cognizant of the difficulties in analyzing and addressing these challenging issues but is nevertheless profoundly disappointed in the caliber of the HECO Companies' efforts and apparent unwillingness or inflexibility to embrace the challenges, commit appropriate resources and provide or acquire the necessary analytical tools to address the issues identified by the commission.

The Framework does provide for the commission to require modifications to the IRP Report or Action Plans as an alternative to approval or rejection of the IRP Report. The HECO Companies maintain that the IRP Report and Action Plans are ready for commission decision making and should be approved but that:

> if the Commission concludes that further steps are necessary to facilitate its review of the Action Plans, the Companies propose that the Commission hold panel hearings to expedite the review process.[158]

As noted above, the flaws in the IRP Report are so fundamental and substantial that it is not reasonable to allow for

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[158]HECO SOP at 3-4.

further revisions or reexamination at this time. In addition, the commission does not agree with recommendations by several parties that the IRP Report can be "fixed" in a short time frame by the HECO Companies or that the substantial and fundamental changes necessary would be appropriate to implement in this phase of proceedings.

The deadline for filing the IRP Report is not intended to merely mark a transition to another separate venue for substantial continued planning activities and analysis outside the purview of the Advisory Group. The procedures for review of the filed IRP Report are not intended to serve as a secondary process for extensive remedial analysis or planning activities.

The commission is also not convinced that remanding analysis to the HECO Companies in this review proceeding would result in substantially different or better results. Based on the HECO Companies' responses to the commission's questions in Order No. 31443 regarding the conclusions in the IE's Summary of Findings in the IE's Final Certification, it does not appear that the HECO Companies chose to fully embrace or acknowledge the clearly documented shortcomings in the IRP Report.

In light of the above, the commission rejects the IRP Report, Resource Plans, and the Action Plans of each of the HECO Company utilities. The commission finds that the IRP Report

is clearly non-compliant and inconsistent with the Framework in several important respects; fails to provide sufficient meaningful analysis and support for the proposed Action Plans; and fails to adequately address the Principal Issues, including the issues and questions specifically identified by the commission in Order No. 30534. The IRP Report therefore does not, in itself, serve as any supporting basis for conclusions or presumptions regarding the need, prudence or appropriateness of the final Resource Plans, Action Plans or the elements included in the Action Plans for any of the HECO Companies in further proceedings before the commission. The rejection of the IRP Report and Action Plans is made without prejudice regarding the ultimate merits of any measures, resources and programs identified in the Action Plans.

The commission shares concerns expressed by several parties that the lack of approved Action Plans may hinder efficient, effective regulatory review of future utility applications.[159] Furthermore, the commission recognizes that credible forecasts and planning assumptions are important for various studies and analyses in several other contexts, including planning and policy analyses by state agencies and other stakeholders as well as evaluations of applications and other

[159]See e.g., CA SOP at 2, 5; DBEDT SOP at 2-4, 18; FWH SOP at 4-7.

reviews conducted by the commission.[160] Although the commission rejects the IRP Report and Action Plans as a basis for any presumptions in future utility applications and commission decisions, the commission does not specifically reject nor does it endorse any of the forecasts, assumptions or scenarios utilized in the IRP process or filed in the IRP Report.[161] The information in the IRP Report is part of the public record and remains available for unrestricted use.

F.

Commission Inclinations Regarding HECO Companies' Development, Retirement and Management of Resources

Without the context and guidance of an approved Action Plan, the commission is forced to address the substantial challenges facing the HECO Companies through numerous individual contested case and investigatory proceedings, rather than comprehensively in the IRP process. Accordingly, the commission

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[160]DBEDT recommends that the IRP Report and Action Plans have essential value and serve purposes supporting other studies, and should be accepted as "filed with, but not approved by the Commission". DBEDT SOP at 2-4, 18. The Consumer Advocate, in its RSOP, conditionally concurs. See CA RSOP at 2.

[161]The commission does explicitly note that none of the planning scenarios was created for the purpose of serving as a base case. No base case scenarios were developed in the IRP process as recommended by the IE and the Consumer Advocate.

has determined that all applications and submissions of the HECO Companies going forward shall be subject to additional careful and detailed scrutiny, while also taking into consideration the Principal Issues identified by the commission, as appropriate.

While this will require additional effort on the part of the HECO Companies to sufficiently justify any capital expenditure or other application, as well as additional effort on the part of the commission to evaluate the submissions of the HECO Companies, the commission has determined that given the circumstances, it will be a more efficient use of limited HECO Companies', commission, and stakeholder resources than attempting to restart the IRP process at this time. The Consumer Advocate recommended that the commission, prior to rejecting the IRP Report, allow the HECO Companies a chance to remedy the identified deficiencies within a period of thirty days. However, the IRP Report is clearly non-compliant and inconsistent with the Framework in several fundamental and crucial aspects, and it is unreasonable to expect a resolution of such fundamental problems with such a short timeframe. As such, the commission will terminate further IRP proceedings instead of unnecessarily consuming further resources. The commission emphasizes that this is an undesirable outcome that is necessary given the failure of the HECO Companies to meaningfully address these challenges and prepare a reasonable IRP Report and Action Plan as required by the Framework.

As discussed above, the failure of the HECO Companies to reasonably comply with the Framework and the fundamental and substantial flaws of the IRP Report and Action Plans have made it necessary for the commission to address the various issues discussed in this decision through separate actions and proceedings. These pending investigatory dockets, other proceedings, and actions are intended and anticipated to provide critical analyses and information that were expected to be provided during the IRP process but are currently unavailable due to the HECO Companies failures, as discussed above. These dockets and actions are summarized below.

Power Supply Portfolio Reviews

The commission has directed each of the HECO Companies to file Power Supply Improvement Plans (PSIP) to address critical power supply resource planning issues. The PSIPs are to include actionable strategies and implementation plans to expeditiously retire older, less-efficient fossil generation, reduce must-run generation, increase generation flexibility, and adopt new technologies such as demand response and energy storage for ancillary services, and institute operational practice changes,

as appropriate, to enable integration of a diverse portfolio of additional low cost renewable energy resources, reduction of energy costs and improvements in generation operational efficiencies. The PSIPs were ordered in the following dockets:

- HELCO Power Supply Improvement Plan (Docket No. 2012-0212)
- MECO Power Supply Improvement Plan (Docket No. 2011-0092)
- HECO Power Supply Improvement Plan (Docket No. 2011-0206)

The PSIPs will address many of the commission's Principal Issues such as environmental compliance, fuel switching, generation fleet modernization, and utilization of renewable energy projects, energy storage and demand response to provide ancillary services.[162] The commission intends to consolidate the review of the three PSIPs into a new investigatory docket.

In addition, the decision and order issued by the commission in the RSWG docket (Docket No. 2011-0206) sets forth a number of system level reliability issues that affect power supply planning and operations and therefore are to be addressed in the PSIPs or in other subsequent reliability related studies.

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[162]See discussion supra at 50-52.

Inter-Island and Inter-Utility Power Transmission Reviews

The commission has commenced several dockets to examine whether inter-island and inter-utility power transmission may be in the public interest. These dockets include:

- Review of Progress of Proposed Lanai Wind Project (Docket No. 2013-0168)
- Investigation of whether Oahu-Maui Inter-Island Transmission System may be in Public Interest (Docket No. 2013-0169)

In effect, these dockets address the commission's Principal Issue related to "whether possible alternate inter-island and inter-utility-system transmission connections may be utilized to increase utilization of renewable energy resources, lower costs of existing fossil-fuel resources, or provide other net benefits, across multiple islands".[163]

Distributed Energy Resources Reviews

The commission has taken or will take various actions to address critical technical, economic and policy issues associated with distributed energy resources. The commission has directed the HECO Companies to develop and file a Distributed Generation Interconnection Plan (DGIP) which will include actionable

[163] See id.

strategies and implementation plans for distribution system upgrades and utilization of advanced inverter technical functionality to enable distribution circuit solar PV penetrations to be increased over time in a safe and reliable manner. Further, the commission has issued an order instructing the HECO Companies to develop and file a Demand Response Portfolio Plan that implements the directives set forth in the commission's demand response policy statement and order concurrently filed in Docket No. 2007-0341. The distributed energy resource related dockets and actions include:

- HECO Companies (consolidated) Distributed Generation Interconnection Plan (Docket No. 2011-0206)
- Feed-in-Tariff Re-examination (Docket No. 2013-0194)
- Demand Response Policy Statement (Docket No. 2007-0341)
- Distributed Energy Resources Review (forthcoming investigation of grid modernization and technical, economic, and policy issues related to integration of distributed energy resources)

In effect, these dockets address, among other issues, the commission's Principal Issues related to energy storage,

ancillary services, and the rate impacts on "utility customers who do not have renewable energy devices".[164]

Achievement of Renewable Energy Portfolio Standard Review

The commission has taken various actions to assess the ability of the HECO Companies to achieve or exceed the RPS targets. These actions include:

- Report to the 2014 Legislature on the Public Utilities Commission review of Hawaii's Renewable Portfolio Standards.[165] The Report examines and presents findings regarding the effectiveness and achievability of the existing RPS requirements.
- Hawaii Renewable Portfolio Standards Roadmap Study, prepared by General Electric under contract with the Hawaii Natural Energy Institute. The study assesses the feasibility of meeting the RPS goals for Oahu and Maui, and evaluates the impact on cost of electricity under different renewable energy growth scenarios. This study is in progress, with initial results indicating a range

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[164]See discussion supra at 53.

[165]See *Report To The 2014 Legislature On The Public Utilities Commission Review Of Hawaii's Renewable Portfolio Standards*, December 2013, accessible at http://puc.hawaii.gov/wp-content/uploads/2013/04/2013-PUC-RPS-Report_FINAL-w-Appnds.pdf

of cost-savings available through integration of additional renewable resources.[166]

In effect, these actions address, among other issues, the commission's principal issue related to the cost and rate impacts resulting from full attainment of the RPS.[167]

Achievement of Energy Efficiency Portfolio Standard Review

The commission has taken or will take various actions to assess the ability of the state to achieve or exceed the EEPS targets. These actions include:

- Report to the 2014 Legislature on the Public Utilities Commission review of Hawaii's Energy Efficiency Portfolio Standards. The Report examines and presents findings regarding the effectiveness and achievability of the existing EEPS requirements.[168]

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[166]See *Hawaii RPS Roadmap Study Task 1 Results.* GE Energy Consulting/Hawaii Natural Energy Institute. Presented Jan. 9, 2014, accessible at: http://www.hnei.hawaii.edu/sites/web41.its.hawaii.edu.www.hnei.hawaii.edu/files/story/2014/01/Full%20Slide%20Deck%201-17-14.pdf

[167]See discussion supra at 51.

[168]See *Report to the 2014 Legislature on Hawaii's Energy Efficiency Portfolio Standard.* State of Hawaii Public Utilities Commission. December 2013, accessible at: http://puc.hawaii.gov/wp-content/uploads/2013/04/2013-PUC-EEPS-Report_FINAL.pdf

- State of Hawaii Energy Efficiency Potential Study. The Report evaluates the long-term achievability of the EEPS goal.[169] This study indicates that there is substantial untapped energy efficiency opportunities available throughout Hawaii. The study estimates that statewide economic (cost-effective) energy efficiency potential exceeds the current statutory goal of 4,300 GWh by nearly 50%.

In effect, these actions address, among other issues, the commission's principal issue related to the cost and rate impacts resulting from full attainment of the EEPS.[170]

Aligning Utility Business Model with Customer Interests and Public Policy Goals

In addition to addressing outstanding issues through the actions described above, the commission has attached to this order its inclinations on the future of Hawaii's electric utilities (Exhibit A). In the absence of an acceptable IRP and Action Plan from the HECO Companies, the commission provides its perspectives

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[169]See *State of Hawaii Energy Efficiency Potential Study*. EnerNOC Utility Solutions Consulting. Revised Report for Review, Jan. 15, 2014.

[170]See discussion supra at 51.

on the vision, business strategies and regulatory policy changes required to align the HECO Companies' business model with customers' interests and the state's public policy goals.

G.

Procedural Matters

Given the commission's rejection of the IRP Report, further activities and Framework requirements in this planning cycle for the HECO Companies are suspended unless otherwise ordered by the commission, including the submittal of an evaluation report required between IRP cycles in Framework section IV.D.2 and associated requirements for information to be provided by the Public Benefit Fund Administrator in Framework section IV.D.2.b.

The commission acknowledges and appreciates the diligence and work of the Advisory Group in this proceeding. Notwithstanding the frustrations associated with the HECO Companies' failures as discussed herein, the commission benefited greatly from the comments made by the Advisory Group throughout the IRP process, and has incorporated many Advisory Group suggestions into the instant decision and order. The work of the Advisory Group will be formally concluded and the Advisory Group relieved of further duties in this proceeding as of the date of this order.

The commission also acknowledges the diligence and work of the IE. The activities of the IE are suspended as of the date of this order.

III.

Orders

THE COMMISSION ORDERS:

1. The HECO Companies' IRP Report is rejected for the reasons stated in this Decision and Order above.

2. Further activities and requirements pursuant to the Framework for the HECO Companies in this IRP planning cycle are hereby suspended unless otherwise ordered by the commission.

3. Further activities of the Advisory Group are hereby concluded, and the Advisory Group is relieved of further duties in this proceeding as of the date of this order, unless otherwise ordered by the commission.

4. Further activities of the IE are hereby suspended as of the date of this order, unless otherwise ordered by the commission.

5. This docket shall be considered closed, unless otherwise ordered by the commission.

DONE at Honolulu, Hawaii APR 2 8 2014.

PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

By Hermina Morita
Hermina Morita, Chair

By Michael E. Champley
Michael E. Champley, Commissioner

By Lorraine H. Akiba
Lorraine H. Akiba, Commissioner

APPROVED AS TO FORM:

Shohei Nishimoto
Commission Counsel

2012-0036.sr

Exhibit A:
Commission's Inclinations on the Future of Hawaii's Electric Utilities

Aligning the Utility Business Model with Customer Interests and Public Policy Goals

The Commission is compelled to offer the following perspectives on the vision, business strategies and regulatory policy changes required to align the HECO Companies' business model with customers' interests and the state's public policy goals. The Commission is compelled because the HECO Companies failed to articulate a sustainable business model in the intervening time period since this directive was set forth by the Commission almost one year ago in Order No. 31288.

As the Commission noted last year, the nature of the electric utility business is evolving rapidly in light of technical, market, and public policy changes that have and will continue to occur in Hawaii. The Commission observed that:

> "... the HECO Companies appear to lack movement to a sustainable business model to address technological advancements and increasing customer expectations. The commission observes that some mainland electric utilities have begun to define, articulate and implement the vision for the "electric utility of the future." Without such a long-term, customer focused business strategy, it is difficult to ascertain whether HECO Companies' increasing capital investments are strategic investments or simply a series of unrelated capital projects to expand utility rate base and increase profits appearing to provide little or limited long-term customer value."[1]

The IRP Action Plan appeared to be, in part, a series of unrelated capital projects without strategic focus on the clear issues facing the utility, and did not indicate further progress towards a sustainable business model. More recently, the HECO Companies' proposed 2014 capital expenditure program also appeared to be comprised of unrelated capital projects without strategic focus and of questionable long-term customer value.

[1]See Docket No. 2011-0092, Order No. 31288, Exhibit C at 3.

Given this continuing void in developing a sustainable business model and strategic vision, the Commission is obligated to reiterate the regulatory oversight direction that was articulated last year:

> "The extent of the HECO Companies' own volition to achieve high performance, provide excellent customer service and affordable rates will determine the appropriate amount of regulatory oversight required. Otherwise, the commission would be forced to employ arduous regulatory scrutiny and oversight of utility expenditures, operations and investments to attempt to achieve the desired performance levels and customer satisfaction. The commission prefers the former but unfortunately, at the present time, *believes* the lack of a strategic and sustainable business model would require more of the latter until there is evidence of an acceptable course correction."[2]

The Commission has not observed an "acceptable course correction" and there is not sufficient evidence, at this time, of progress by the HECO Companies towards developing and implementing a sustainable business model. By contrast, the Commission does note that the state's other electric utility has clearly articulated a strategic vision and made substantial progress in achieving their goals over the same time period.[3]

In the meantime, Hawaii's electricity customers continue to endure the highest electricity prices in the country, and the high cost of this essential service imposes substantial burdens on Hawaii's households and businesses. Unlike many jurisdictions where public policy goals to reduce harmful emissions from fossil-based electricity generation and increase use of renewable energy may conflict with economic goals to lower the cost of electricity, Hawaii has already entered a new paradigm where the best path to lower electricity costs includes an aggressive pursuit of new clean energy sources.[4] By embracing cost-effective clean energy opportunities that displace today's high-cost oil-fired generation, Hawaii's electric utilities can

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[2]Order No. 31288, Exhibit C at 5-6 (emphasis added).

[3]See Kauai Island Utility Cooperative Strategic Plan on website homepage, accessible at-http://website.kiuc.coop/content/strategic-plan. Moreover, KIUC has been able to manage utility operations over the last decade with far fewer, and substantially less, base rate increases than each of the HECO Companies.

[4]See *Application for Approval of Additional Waivers from the Framework for Competitive Bidding*, filed Nov. 4, 2013 in Docket No. 2013-0381, at 18. According to HECO, the average levelized price of the utility-scale solar PV projects included in the Application is 15.576 cents per kWh (calculated without state tax credits), which is significantly lower than HECO's avoided cost of generation (22.697 cents per kWh at the time of filing).

stabilize and lower customer bills while expanding choices for customers to manage their energy use.

The Commission views the objectives of lower, more stable electric bills and expanding customer energy options, while maintaining reliable energy service in a rapidly changing system operating environment, as essential principles that are the foundation for the future strategic business direction of the HECO Companies. By extension, these principles are also important criteria in the review and approval of future utility capital investment projects and programs.

To clarify these fundamental principles and to better align the HECO Companies' business model with customers' interests and the state's public policy goals, the Commission provides guidance for future business strategy, energy resource planning and project review in three separate sections:

- *Creating a 21st Century Generation System* – Hawaii has unique challenges and opportunities requiring the State to leap ahead of many other jurisdictions by modernizing the electricity generation system to integrate clean energy resources that cost less than today's oil-fired generation. With the high cost of today's system and long lead times required to implement projects in this sector, the electric utilities need to move with urgency to modernize the generation system on each island grid as delays are lost savings opportunities.

- *Creating Modern Transmission and Distribution Grids* – outlines priorities in order to transform each island's transmission and distribution grids into modern, advanced electrical networks that are capable of integrating greater quantities of customer-sited distributed energy resources and expand the array of energy options for customers to manage their energy usage.

- *Policy and Regulatory Reforms to Achieve Hawaii's Clean Energy Future* – sets forth high priority changes to existing electric utility regulatory policy and rate structures the Commission believes are necessary to achieve Hawaii's clean energy future consistent with the fundamental guiding principles discussed above.

Section 1: Creating a 21st Century Generation System

The costs of fuel and purchased power constitute the largest components in today's high bills for electricity customers and represent a major strategic opportunity for lowering electric rates. While the HECO Companies have progressed significantly in integrating renewable energy, the cost of utility-scale renewable technologies continues to decline markedly to the point where new renewable projects can cost substantially less than the cost of oil-derived fuels utilized in

today's existing plants. Therefore, to further stabilize and lower the costs of generation, the HECO Companies should expeditiously:

- Seek high penetrations of lower-cost, new utility-scale renewable resources
- Modernize the generation system to achieve a future with high penetrations of renewable resources
- Exhaust all opportunities to achieve operational efficiencies in existing power plants
- Pursue opportunities to lower fuel costs in existing power plants

In carrying out these goals, the Commission puts forward the following guidelines for the review of future generation-related projects in each of these areas.

Aggressively Seek Lower-Cost, New Utility-Scale Renewable Resources

As noted earlier, a paradigm shift has occurred in Hawaii where new utility-scale renewable resources now cost less, sometimes considerably, than utilizing oil-derived fuels in existing older, less-efficient power plants. With this shift, the focus of future utility resource planning and acquisition efforts should be on integrating the maximum level of cost-effective renewable resources while maintaining adequate reliability of the electricity grid.

New generation resources should lower system costs and maximize use of cost-effective renewable resources – Existing renewable energy projects have yielded significant customer savings compared to today's high cost of oil.[5] Recent solicitations for new renewable projects on Oahu indicate potentially larger savings are available in the future.[6] The HECO Companies should continue to solicit and acquire projects that can stabilize and lower the overall cost of energy consistent with the State's energy policy goal of a balanced and diversified portfolio of renewable resources. However, in spite of the recent decline in the cost of renewable energy projects in Hawaii, the Commission notes that these costs remain appreciably higher than corresponding costs of similar utility-scale renewable energy projects on the mainland. The

[5]See *Report to the 2014 Legislature on the Public Utilities Commission Review of Hawaii's Renewable Portfolio Standards*, December 2013, at 17 (http://puc.hawaii.gov/wp-content/uploads/2013/04/2013-PUC-RPS-Report_FINAL-w-Appnds.pdf); See also Maui Electric Co. estimates of savings from purchased wind energy (http://www.mauielectric.com/meco/Clean-Energy/Latest-Clean-Energy-News/Understanding-Renewable-Energy-and-Wind-Energy-Integration?cpsextcurrchannel=1).

[6]See Docket Nos. 2013-0156, 2013-0381, and 2013-0423.

HECO Companies should continue to pursue alternative procurement strategies to ensure that the lowest cost utility-scale renewable energy projects are acquired.[7]

Furthermore, long-term planning efforts should focus on the required changes and investments in the utility system that can allow the island systems to reliably integrate the maximum level of cost-effective renewable resources, taking into account integration costs. Consistent with the recommendations of the Reliability Standards Working Group ("RSWG"), unless there is a compelling reason otherwise, the utilities' planning efforts should remain technology agnostic and neutral to ownership of assets[8]. Therefore, it is necessary that the Commission prioritize the review and approval of projects that exhibit preferred characteristics that are beneficial to the system. Additionally, the Commission is willing to consider proposals with innovative shared-savings incentive mechanisms consistent with Act 37 passed during the 2013 Legislative Session[9].

Pursue a balanced portfolio of new energy resources – There is clear evidence that pursuing a diverse portfolio of renewable energy resources provides the best long-term strategy to maximize the use of renewables to achieve public policy goals. Project development and system integration costs may rise as higher levels of renewable resources are added to each grid and higher levels of any single energy resource will increase the challenge of adding new projects. Furthermore, as communities with the most abundant indigenous renewable resources are increasingly asked to host energy infrastructure, these communities are understandably concerned with the impacts of these projects and have voiced their opposition in several instances. For these reasons, the Commission supports a balanced and diverse portfolio of energy resources as the best long-term strategy to achieve the state's energy goals. This principle overarches a wide spectrum of issues, such as firm versus variable resources, types of renewable resources (e.g., wind, solar, biomass, hydro, geothermal, and waste to energy, etc.), geographic location, and utility-scale versus distributed resources.

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[7]The Commission observes that utility-scale solar PV projects have been announced in Texas and California priced at less than five cents per kWh. In other words, the solar PV projects included in HECO's application in Docket No. 2013-0381, while representing a significant savings over HECO's avoided cost, are still priced more than three times greater than recent mainland projects.

[8]See Reliability Standards Working Group, Independent Facilitator's Final Report, Minimum Load and Curtailment Subgroup Recommendations at 3a-1, filed Mar. 25, 2013 in Docket No. 2011-0206.

[9]See Act 37, 2013 Session Laws of Hawaii.

Modernize the Generation System to Achieve a Future with High Penetrations of Renewable Resources

Under traditional resource planning, utilities would typically seek to build new generation units when the total electricity demand was anticipated to outgrow the capacity of existing generation along with the need to maintain adequate reserves to deal with emergency situations. Today, utility energy sales have declined due to successful energy efficiency efforts, conservation by customers, and the rapid growth of customer-sited photovoltaic (PV) systems. In combination with the significant additions of other variable renewable energy sources, new needs have emerged on Hawaii's electricity grids where traditional utility planning is not sufficient to address these aforementioned trends. Innovative planning efforts are required to anticipate a future grid with high penetrations of renewable resources and to achieve significant energy cost reductions. The Commission articulates several guidelines in this area.

Investments in Grid Flexibility – With the growth of utility-scale and distributed renewable resources, Hawaii's electricity system is changing at an unprecedented pace and scale. Recent integration studies and planning efforts show that integrating high levels of renewable resources will require grids that can accommodate the new demand patterns and the variability of renewable resources.[10] These studies also indicate that Hawaii's grids will require new tools to achieve higher penetrations of renewable resources and to maintain grid stability. For these reasons, the Commission is generally supportive of the utilities' efforts to cost-effectively upgrade the generation system to enable integration of renewables, which could include investments to improve the flexibility of existing generation and the addition of new units which have characteristics to accommodate substantial additional renewable energy in the future. However, these efforts must also utilize new tools, such energy storage, demand response, and other load management techniques,[11] on an equivalent basis to traditional generation assets, which is consistent with a vision of an "Integrated Grid" of the future articulated by some industry analysts.[12] Future resource plans for each island grid need to demonstrate the optimal mix of existing and new resources to meet operational needs efficiently and cost-effectively. Consistent with this guideline, the Commission has required

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[10]See, e.g., the Hawaii Solar Integration Study prepared for Oahu and Maui (http://www.hnei.hawaii.edu/research/grid-systems/grid-modeling-and-analysis), and the Energy Storage RFP released by KIUC (http://website.kiuc.coop/content/rfp-energy-storage-dispatchable-renewable-energy).

[11]See, e.g., J. Lazar. Teaching the Duck to Fly. Regulatory Assistance Project. January 2014.

[12]See, e.g., the recent research initiative started by the Electric Power Research Institute (EPRI) http://www.epri.com/Our-Work/Pages/Integrated-Grid.aspx

each of the HECO Companies to file "Power Supply Improvement Plans" to identify strategies, action plans and schedules to expeditiously achieve the results contemplated in the guidelines set forth in Section 1.[13]

Pursue cost-effective retirements expeditiously – Many of the utilities' existing generating plants have exceeded their original design lives. Typically, on each island grid, these plants are the most expensive to operate, having substantially higher heat rates, overall fuel expense, staffing levels, and on-going maintenance expense and capital expenditures, and in many cases these older plants are the least "flexible" units contributing to the uneconomic curtailment of renewable resources and/or out-of-merit uneconomic dispatch. The HECO Companies should continue to evaluate opportunities to retire and replace older, high-cost plants with new resources with valuable characteristics that provide required support services cost-effectively to maintain a reliable electricity grid with high levels of renewable resources.

All generation resources should contribute to system stability –Traditionally, utility-owned generation provided most of the grid support services required to maintain system stability. On island systems with rapidly growing utility-scale and distributed variable resources, individual utility-scale projects and, in aggregate, distributed resources can have a significant impact on system stability. Consistent with meeting the future needs of Hawaii's island grids, the electric systems should evolve such that all generation resources, whether utility, IPP or customer-owned, will contribute to maintaining system stability. Therefore, to maximize the integration of variable renewable energy resources, the Commission expects the HECO Companies to require all generators to address and support system stability consistent with their resource characteristics and state-of-art technical capabilities.

Exhaust All Opportunities to Achieve Efficiencies in Existing Plants

The Commission articulates further guidance in this area. The HECO Companies' generating units realize a wide range of operating efficiencies, depending in part on each unit's age, technology, and mode of operation. In many cases, utility-owned generation is significantly less efficient than IPP-owned generation, suggesting there is an opportunity to reduce costs to customers by improving the efficiency of the utility's existing generation fleet.

Greater visibility into and accountability for economic dispatch of generation – The HECO Companies operate the island grids with numerous generating units designated under "must run" status to provide certain services to maintain the reliability of the grid. In effect, these

[13]Requirements to prepare Power Supply Improvement Plans are found in Order No. 32055, filed April 28, 2014 in Docket No. 2011-0092; Decision and Order No. 31758, filed Dec. 20, 2013 in Docket No. 2012-0212; and Decision and Order No. 32053, filed April 28, 2014 in Docket No. 2011-0206. The Commission has also issued a Policy Statement related to demand response programs in Order No. 32054, filed April 28, 2014 in Docket No. 2007-0341.

operating rules require high-cost generation units to remain online continuously, resulting, at times, in the curtailment of renewable energy sources or displacement of generation from other lower-cost units. Significant advances in technologies such as power electronics, demand response and energy storage can provide similar grid services and the potential to deliver these services from non-utility owned renewable energy generation cost-effectively. Therefore, in the Power Supply Improvement Plans, the HECO Companies are expected to include the utilization of the most cost-effective resources to provide grid services including alternatives to operating older, less efficient generation units under a "must run" designation.

Unbundle provision of essential grid (ancillary) services – As a corollary to the prior point and to further promote lower costs in the generation sector, the Commission will be pursuing opportunities to "unbundle" the provision of essential grid services to allow independent producers to offer these services through non-traditional technologies, such as demand response and energy storage systems, or non-utility owned generation, when more cost-effective. In short, as technologies evolve and the needs of the grid change over time, the HECO Companies must be amenable to implementing all potential alternatives that can maintain essential grid services and lower costs to customers.

Expeditiously Seek Alternatives to Lower Fuel Costs in Existing Power Plants

Even with the rapid growth of renewable resources, the HECO Companies continue to rely heavily on imported oil-derived fuels, passing the high costs to their customers. To stabilize and lower customer bills, the HECO Companies need to expeditiously develop and implement opportunities to reduce fuel costs in existing power plants.

Transparently seek opportunities to import liquefied natural gas (LNG) consistent with Hawaii's clean energy policy goals – Recent analyses have indicated that Hawaii may have an opportunity to reduce fuel costs by importing LNG.[14] The Commission recognizes that substituting another fossil fuel for oil raises a number of concerns from some stakeholders in Hawaii's energy policy discussions. The Commission notes that the "default" fuel to meet environmental requirements for most non-renewable electricity generation in the near future will be diesel fuel. In the absence of an alternative to diesel, customers will continue paying for a fuel that is expected to remain costly and subject to volatile price swings.

The Commission notes that persistently high electricity bills have a direct economic impact on all Hawaii residents and businesses. High energy prices translate into higher costs and reduced

[14]See *Liquefied Natural Gas Report* prepared under contract to the Hawaii Natural Energy Institute (http://www.hnei.hawaii.edu/publications/liquified-natural-gas) and the *LNG Imports Study* prepared under contract to HECO (http://www.hawaiianelectric.com/vcmcontent/IntegratedResource/IRP/PDF/IRP-2013-App-N-LNG-Imports-Study-062813-Filed.pdf).

disposable income for residents paying high electricity bills, resulting in the purchase of fewer goods and services overall. Whether directly through higher electricity bills or indirectly by paying higher prices for goods and services, all of Hawaii's residents, businesses, and visitors pay a significant price for continued reliance on high-cost fuels. From an economic perspective, if diesel fuel remains a significant portion of the energy mix Hawaii's customers are likely to continue paying high electricity bills even with fuel savings from the addition of renewable resources. From an environmental standpoint, the importation of petroleum products still contributes to the state's carbon footprint and poses a substantial risk for a major oil spill. A fuel switch from oil to LNG would help the HECO Companies reduce criteria pollutant emissions from existing power plants to meet EPA air quality regulations and, at current prices, may also help lower fuel costs.

Noting that remaining dependent on diesel fuel has the potential to be a persistent drag on the state's economy and pose significant risks to the environment, the Commission believes the HECO Companies must expeditiously seek alternatives and that the importation of LNG could be consistent with the state's clean energy policies under several guiding principles. These include:

- *Achieve significant fuel cost savings* – New fuel infrastructure will likely require large capital investments and the savings delivered to electricity customers should be commensurate with the risk of the investments.

- *Support and enhance opportunities to meet and/or exceed clean energy goals* – Proposed plans to utilize LNG need to articulate a convincing strategy that LNG is consistent with and will enhance the opportunity to meet and/or exceed the State's RPS and EEPS policies cost-effectively, and support clean energy transportation goals, where feasible.

- *Expedite the retirement of inefficient and inflexible generation* – In evaluating older units that will require emissions reduction modifications, the HECO Companies need to use this opportunity to consider an expedited retirement schedule to replace old units with cost-effective, flexible alternatives with characteristics that are better suited to integrate variable renewable energy sources.

- *Diversify risks with a portfolio of fuel supplies* – The global LNG market has evolved to provide new options to the long-term supply contracts that characterized the market traditionally. While Hawaii's demand will always remain limited on the global scale, buyers now have opportunities to purchase LNG on spot markets, short-term and long-term contracts, and utilize different price indices. With a portfolio of supply options, the utilities can and should diversify some of the price risks associated with this fossil fuel.

- *Utilize transparent, competitive processes to solicit potential suppliers* – the Commission strongly believes customers and Hawaii's citizens will be best served by utilizing transparent, competitive processes, customized to Hawaii's unique market, in the development of any new fuel supply options.

The Commission believes there are long-term implications associated with the decision to import another fossil fuel into our state that need to be carefully considered. For example, the term and volume of imported LNG should reflect that use of renewable energy resources will continue to expand and thus the need for LNG for power generation would decline over time. Furthermore, the proposed savings estimated in the LNG studies conducted to date have yet to materialize in any proposal that has been submitted for regulatory approval. When such proposals are submitted, the Commission intends to exercise careful review and scrutiny to ensure a proposed project delivers promised benefits to customers with minimum risks.

Seek all cost-effective renewable fuels to displace fossil fuels in firm generation – For the reasons noted above, and as evidenced by several recent decisions[15], the Commission strongly supports a concerted effort to displace fossil fuel supplies in firm generation with the development of cost-effective, locally-produced renewable fuels. The Commission understands that renewable fuels can provide many new and important economic opportunities and can potentially displace fossil fuels in the transportation sector. However, it is difficult for the Commission to justify having customers bear unreasonable cost premiums in today's high customer bill environment. As new fuel contracts come before the Commission for approval, cost-effective proposals that can offer customer savings and that can clearly quantify local economic benefits will be viewed more favorably.

Section 2: Creating Modern Transmission & Distribution Grids

The transmission and distribution grids on each island are comprised of a network of critical energy infrastructure required to deliver electricity supply and provide essential grid support services for all customers to enable electricity to be used efficiently, reliably and safely. Increasingly, this network also accepts renewable energy from distributed energy resources (DER) and other grid support services customers may choose to supply to the grid.

Traditionally, the utility focused on maintaining the system networks and the planning necessary to upgrade the transmission and distribution infrastructure to support growing energy demand. However, looking towards the future, the Commission believes Hawaii should

[15]See Decision and Order No. 31758, filed Dec. 20, 2013 in Docket No. 2012-0212; Decision and Order No. 31487, filed Oct. 11, 2013 in Docket No. 2011-0369; Decision and Order No. 30950, filed Jan. 17, 2013 in Docket No. 2012-0129; and Decision and Order No. 30895, filed Dec. 13, 2012 in Docket No. 2011-0368.

be poised to lead the world in the development of advanced grids that can interlink a bulk power system that has a high level of renewable generation with the profusion of DER. With appropriate and mutually beneficial investments in the transmission-and-distribution grids, the HECO Companies should be prepared to anticipate and enable the energy choices that customers will demand and integrate customer-side resources into the broader electric system in an effort to provide benefits to all system users.

The Commission also recognizes a growing role for non-utility energy service providers that can intermediate the relationship between the utility and customer by aggregating distributed, customer-side energy resources into controllable resources with technical characteristics that are similar to conventional generation resources, described sometimes as "virtual power plants".[16] Virtual power plants combine DER to provide seamless, controllable, responsive energy and ancillary services to the grid, much as the utility's existing power plants do today. Hawaii's utilities should take action now to enable incorporation of virtual power plants and integrated energy districts (further discussed below) into power system design and operation.

With approximately 10% of residential customers already operating rooftop PV systems, Hawaii is a frontrunner in the initial growth stage of DER. Therefore, it is incumbent upon the HECO Companies to plan for and address DER interconnection challenges and simultaneously move forward aggressively to develop and garner stakeholder support for the modernization of its transmission-and-distribution grids to further enable integration of DER and to provide customers with critical information to make sound energy choices. Accordingly, the Commission has recently required the HECO Companies to develop and file a distributed generation interconnection plan (DGIP).[17] The Commission puts forward the following guidelines for the review of future transmission-and-distribution system projects and programs.

Creating Hawaii's Modern, Integrated Transmission System

Hawaii's high-voltage transmission networks interconnect geographically dispersed utility-scale fossil and renewable energy supply resources with major population or load centers on each island. The transmission network enables multiple generation resources to be dispatched in an economic manner as well as respond to generation unit or transmission line outages by automatically and instantaneously redirecting power flows. The Commission articulates the following guidance with regard to transmission planning and the future development of new transmission system projects on Hawaii's grids:

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[16]See e.g., A. Zurborg. *Unlocking Customer Value: The Virtual Power Plant.* Power World 2010. ABB/Ventyx, accessible at http://energy.gov/sites/prod/files/oeprod/DocumentsandMedia/ABB_Attachment.pdf

[17]See Order No. 32053, filed on April 28, 2014, in Docket No. 2011-0206 at 49.

New transmission projects must consider non-transmission alternatives - New, replacement or upgrade high-voltage transmission projects generally represent significant, lumpy capital investments that will be given careful scrutiny. Non-transmission alternatives (NTAs) such as local peaking or back-up generators, energy storage, demand response and smart grid resources are technically and commercially viable alternatives and must be evaluated as part of any economic justification for new transmission system projects.

New utility-scale combustion-technology generation projects should be located at existing utility or IPP generating plant sites - Utilizing existing sites, to the extent possible, will minimize the need for future geographical expansion of the transmission grid solely to interconnect new projects, access existing fuel supply infrastructure and minimize or eliminate the need for new land use permitting. While acknowledging that siting these new projects on existing plant sites is a sound planning principle, the Commission does recognize that new plant sites may need to be proposed as part of future microgrid projects. In these cases, the Commission will weigh the need to expand and upgrade the transmission grid with other key objectives in utility planning, such as energy security and grid resiliency.

Interconnection of large-scale renewable energy projects - Locating large-scale renewable energy projects in remote geographic areas to harness world-class renewable energy regimes needs to be balanced with cost of transmission system upgrades required to deliver these remote power supplies to major load centers cost-effectively.

Interconnection of island grids – In Docket No. 2013-0156, parties have stated that the inter-island connection of individual island utility grids (grid-tie connection) may have intrinsic technical, operational and economic benefits, particularly as it relates to integration of large quantities of variable renewable energy resources that could potentially support the installation of undersea inter-island transmission cables, assuming projects are cost-effective and environmentally sound. The Commission's investigation to determine if an interconnection of the Oahu and Maui grids may be in the public interest is ongoing.

Development of Integrated Energy Districts – Technological innovation is supporting the development of integrated energy districts that aggregate pockets of load and generation resources, which can disconnect and reconnect to the main grid in times of emergency. A subset of this aggregation concept is sometimes described as a microgrid.[18] Several microgrid demonstration projects are underway in Hawaii and large energy customers are investigating the development of these systems to meet their energy needs. As the island electric systems

[18]The concept of an "integrated energy district" was recently described in detail in a presentation by Ken Geisler at the Maui energy conference, "Energy Utilities: The Future is Not What It Used to Be."

evolve, the utilities' transmission system planning needs to address the potential development of integrated energy districts and, as the technology matures, these systems will need to be evaluated as potential non-transmission alternatives to expansion of the transmission system. There are examples of integrated energy districts already operating in Hawaii, including the more common examples of large customers with campus-type facility layouts and independent distribution systems (such as those owned and operated at various university facilities throughout the state)[19], as well as more sophisticated and truly integrated systems such as the HC&S plantation and irrigation system on Maui or those at military installations on Oahu, such as at Joint Base Pearl Harbor-Hickam and in development at Camp Smith.

In summary, the Commission notes that future transmission system projects submitted for review and approval will need to clearly demonstrate how such a proposed project will comport with the transmission system guidelines set forth herein, help to maintain safe and reliable electricity service, support the state's clean energy goals, and provide the most cost-effective option among competing alternatives.

Developing a State-of-the-Art Distribution System to Enable Clean Energy

Hawaii's electric distribution systems physically interconnect a customer's premise to deliver grid-supplied power, as well as to accept customer-supplied power. Effectively, this opens the opportunity for the DER-equipped customer to become a "prosumer", that is a customer who both consumes or uses utility services and may also provide services to the utility. With significant penetration of renewable DER opening new opportunities for customer choice, the distribution system will need to function more like a multi-path transmission network rather than a radial delivery system of the past. The widespread adoption of DER combined with utility-scale resources to create a portfolio of renewable generation and grid services is a critical example of the kind of expertise a utility looking towards the future must have to evolve as a network systems integrator and operator to meet the expectations of its customers, achieve the state's clean energy goals and provide safe, reliable and affordable electricity.

The Commission believes the HECO Companies will need to move promptly with plans to upgrade the utilities' distribution systems to enable new clean energy technologies and improve customer service. New demands on the distribution system will require investments in advanced distribution system technologies, which is currently an area of significant innovation within the electric utility industry. Accordingly, the Commission has ordered the HECO Companies to develop and submit a distributed generation interconnection plan (DGIP) to provide a coherent strategy to modernize each island's distribution system and justify that the

[19]While many independently-owned electrical distribution systems may not currently be operating as a true integrated energy district, this option may become more appealing for customers in the future for energy security, resilience, and cost management reasons.

large capital expenditures required to improve distribution systems are prudent investments that warrant Commission approval. The Commission provides the following broad guidance in the future development of the Companies' distribution systems:

Adopt Advanced Distribution System Technologies and Planning to Cost-Effectively Integrate Renewables and Improve Customer Service - An advanced distribution system is a condition precedent for high penetration of distributed generation, supporting other new customer energy options such as electric vehicles (EV), and improving customer service through enhanced outage detection and timely restoration. These investments would allow a transition from today's one-direction distribution network into a smart distribution system where distribution circuits and substations are capable of bi-directional power flows. The future distribution system must have the capability to act both as a delivery service and an aggregator of customer-sited distributed energy resources to benefit the customer and the grid. The Commission also notes that long-term distribution system planning should include:

- Incorporation of potential opportunities to create microgrids into transmission and distribution grid-planning processes. As discussed above, customers with large critical loads, groups of buildings or neighborhood groups should have the option to develop self-generation resources capable of meeting some level of their own power needs by "islanding", or disconnecting from the grid, when grid supplied electricity is interrupted, constituting a microgrid for purposes of reliability and resiliency.

- Utilization of an Integrated Distribution Planning process, with stakeholder participation, to ensure that grid is capable of integrating DER and potentially reduce future transmission and distribution costs. This planning process should include transparent criteria to prioritize circuit upgrades and set timelines for implementing the recommended changes.

Develop Customer-Focused Advanced Metering Infrastructure Program - The HECO Companies have proposed a smart grid program to include advanced metering infrastructure. Although the Commission believes advanced metering technologies are the key foundational infrastructure for an advanced distribution system, the Companies will need to provide strong supporting evidence and justification that this major investment will improve customer service and system efficiencies from the outset and complement broader efforts to upgrade their distribution systems. For this reason, the Commission offers the following guidelines in the development and implementation of smart grid and advanced metering infrastructure programs:

- Focus on delivering immediate value and benefits to customers with installation of smart grid infrastructure. Examples would include offering web portals for customers to

access and view energy consumption data; improving outage response and power quality; and supporting rapid adoption of innovative rate structures.

- Enable customer-sited distributed energy resources, including broader use of demand response technologies, electric vehicle charging networks, distributed generation, and energy storage systems.

- Work with third party service providers, such as Hawaii Energy, to maximize benefits to customers as the Companies expand smart grid programs in all service territories.

- Develop data privacy policies prior to widespread rollout of smart grid infrastructure and ensure continual reassessment and updating of such policies.

Harness Distributed Energy Resources (DER) to Benefit System and Customers - In recent years, Hawaii has seen exponential growth in rooftop photovoltaic (PV) systems. Coupled with continued innovation in other distributed energy resources, such as electric vehicles and distributed energy storage, the utilities will need to plan proactively for future additions of DER. The rapid adoption of these technologies will require the utilities to design programs and develop distribution system infrastructure to optimize the system and maximize customer benefits. In addition, the Commission believes supporting these programs could provide the utilities' new revenue-earning opportunities through activities such as enabling electric vehicle charging networks and aggregating DER.[20] Accordingly, the Commission has recently ordered the Companies to develop and file a distributed generation interconnection plan (DGIP) that will include stakeholder input and review. A critical component of the overall DGIP is an Advanced DER Technology Utilization Plan that identifies how customers will install, and the utilities will utilize as an integrated DER portfolio, advanced inverters, distributed energy storage, demand response, and electric vehicles to mitigate adverse grid impacts on utility distribution circuits and the system as a whole.[21] At a minimum, these plans should address the following:

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[20]In some cases, these services may constitute so-called "below the line" services or non-utility business activity more appropriately provided by a utility-affiliate.

[21]The U.S. Department of Energy has funded a number of demonstration projects that include energy storage and integration of distributed energy resources, including projects in Hawaii. For more information, see project summaries at https://www.smartgrid.gov/recovery_act/overview/smart_grid_demonstration_program. Japan's New Energy and Industrial Technology Development Organization (NEDO) has also funded the "JUMPSmart Maui" project to demonstrate integration of advanced DER technologies with the Maui grid. Given the preponderance of these demonstration and pilot projects, the Commission believes the HECO Companies should be prepared to accommodate widespread adoption of DER technologies.

- The utilization of grid support functionality embedded in advanced inverters, customer-sited energy storage, and energy management systems to provide ancillary services;

- Enabling two-way communications with customer-sited DER to enable real-time monitoring and active utility management;

- The utilization of technical capabilities of advanced inverters, energy management control systems and customer energy storage systems to develop a non-export option for distributed generators, and the development of appropriate tariff provisions to accommodate this choice; and

- The utilization of distributed energy storage sited on utility distribution infrastructure or behind the meter to mitigate the impacts of high penetration solar PV systems.

Develop and Maintain Cyber-security Requirements for New Distribution System Technologies – With the addition of new information technology and two-way communications systems into utility distribution networks and operations, the HECO Companies will need to develop and maintain cyber-security requirements that protect customer's privacy and the electric system's security. These requirements are not static, and will need to evolve with ongoing changes in technology and customer needs and will be reviewed by the Commission to meet acceptable standards and practices.

Section 3: Policy and Regulatory Reforms to Achieve Hawaii's Clean Energy Future

The utility's traditional role in power supply is changing with high penetrations of renewable energy resources, the retirement of existing fossil generators and the need to incorporate new smaller, more flexible and efficient generators. The utility's role in energy delivery is also evolving to effectively become that of a network systems integrator and operator. With more distributed energy resource options, as discussed above, a customer's role has the potential to evolve to effectively become a "prosumer", that is one who consumes utility power supply and utilizes grid services as well as provides power supply and grid support services to the utility.

As a consequence of these changes, the Commission notes that Hawaii's electric utilities will increasingly be required to:

- Integrate large quantities of utility-scale, primarily variable renewable energy resources onto the transmission system;

- Add increasing amounts of customer-sited distributed generation onto the distribution system;

- Implement power supply improvement plans to systematically retire old, inefficient fossil generators, acquire new flexible generation resources and utilize technologies such as energy storage and demand response to reduce costly must-run generation;
- Incorporate and dispatch an expanding portfolio of utility-scale and distributed renewable resources in conjunction with a declining fossil power supply portfolio to maximize renewable energy and minimize energy and ancillary service costs;
- Procure and manage a diverse commercial portfolio of fossil fuel supply contracts and renewable energy power purchase agreements to increase cost-effective renewable energy utilization, lower total energy costs and minimize and mitigate energy commodity price volatility;
- Integrate demand response (DR) technologies and dynamic pricing rate structures to manage and shift customer loads on a real-time basis to better accommodate as-available renewable energy supplies;
- Utilize smart meter, communication network and data management technologies to empower customers to better manage their energy usage and access other energy management options; and
- Employ diverse smart grid technologies including energy storage, smart inverters, electric vehicles and smart grid control devices into a seamless, integrated operating system.

The aforementioned strategic initiatives must be assimilated in a cohesive, integrated manner to address rapidly changing customer, technical and economic requirements. Therefore, Hawaii's electric utilities will need to transform their business models accordingly, particularly in the power generation and energy delivery functions. This section provides perspectives to achieve this transformation in these key business functions. To accomplish this in a timely manner, a fundamental challenge for the HECO Companies will be the commitment to devote sufficient senior management attention and corporate resources to effectuate this transformation.

New Business Model to Become World-Leading Operator of High Renewables Grids

As set forth in *Section 1: Creating a 21st Century Generation System*, the HECO Companies need to plan for and seek high penetrations of lower-cost, new utility-scale renewable energy resources, exhaust all opportunities to achieve operational efficiency and lower fuel cost in existing plants, retire old, inefficient fossil generation and replace inflexible generators with new, smaller, highly flexible, efficient generators. Consequently, power supply improvement plans must be developed and implemented to strategically integrate additional renewable

energy resources as well as modernize the existing fleet of fossil generation in order to lower fuel and operating costs.

However, the Commission notes several elements of the utility's current business model for power supply that may impede this transition, which are further described below:

- *Continued utility ownership of generation* – Utility-owned generation creates inherent financial conflicts that can complicate, and in some cases impede, development of independent (IPP) generation projects. This creates regulatory challenges for the Commission, as well as a public distrust about investor-owned utility motives. It is difficult to ascertain whether project development delays, contractual disputes with independent developers or utility reluctance to quickly embrace change are predicated upon legitimate technical reasons or driven by existing and future utility generation rate base investment concerns and traditional utility business practices. The future role of the HECO Companies in power generation needs to be redefined in light of these conflicts.

- *Retirement of fossil-fueled generation* - The amount of fossil generation in service in Hawaii will, by necessity, decline over time due to continued integration of renewable energy resources begging the question of whether utility or IPP fossil generation should be retired. Significant IPP fossil generation capacity exists on Oahu and Hawaii Island, which are newer, more efficient and lower cost to operate than existing utility fossil generation. It is reasonable to believe continued operation of IPP generation is in both the customer and public interest, provided power purchase agreements contain reasonable pricing terms and conditions.[22]

It is further reasonable to assume that the HECO Companies' traditional role as owner and operator of a fleet of fossil generation units will diminish over time as old, inefficient utility generation is retired and if new renewable and fossil generation is developed solely by IPPs. Stated differently, the HECO Companies' generation portfolio will diminish over time in terms of the total number of generating units operated, aggregate amount of capacity in-service, annual generation output and net depreciated plant investment, in response to retirements of utility fossil generation and assuming HECO does not acquire ownership of new generation. With appropriate economic and regulatory incentives to hasten retirements of utility fossil generation (and perhaps penalties for retirement delays), the HECO Companies' role with respect to existing fossil generation could decline at an accelerated pace.

[22]The Commission expects that the HECO Companies will fully investigate all legal opportunities to re-negotiate, modify, or terminate high-priced IPP contracts for the benefit of their customers consistent with their public interest obligations.

The role of the HECO Companies with respect to ownership of new generation is the critical policy issue with respect to the future generation fleet on each island grid. In this regard, the HECO Companies have not demonstrated with recent utility generation plant additions that they can be cost competitive with IPPs, nor has the company demonstrated inherent skills and expertise in developing and managing renewable energy projects. The Commission will consider whether it is reasonable and in the public interest to preclude the HECO Companies, as a matter of regulatory and public policy, from ownership of new generation and incent accelerated retirement of old, inefficient fossil generation in order to further diminish inherent financial conflicts with utility ownership of generation.

The Commission further articulates several essential functions of Hawaii's electric utilities:

Key Business Function #1 - System Planner and Operator of High Renewables Grids

Notwithstanding the foregoing, the HECO Companies have a critical role to perform in the future regarding Hawaii's power supply function. The HECO Companies are the logical entity to develop and implement power supply improvement plans that are necessary to create the 21st Century Generation System. The HECO Companies uniquely possess the institutional expertise and knowledge of the current generation portfolio and operation of the bulk power grid. This suggests the utility will continue to be the incumbent utility power supplier even as an increasing share of the electricity supplied to customers is procured from IPPs pursuant to PPAs. More importantly, the HECO Companies would no longer have a financial interest in the outcomes of future power generation development and investment decisions.

The Commission also notes several potential elements of a potential new business model for the power generation sector:

- *Integrated grid operation and fuel procurement* - An integrated approach to fossil fuel procurement, fuel switching and environmental emission controls may result in lower overall fuel and purchased power expense benefiting utility customers.[23] It may also become increasingly more difficult for IPPs to make competitive commercial arrangements for fossil fuel supply given uncertainties as to future quantities of renewable energy availability and power supply operational requirements. The HECO Companies have considerably greater information about future fossil power supply requirements than do individual IPPs and are logically well-positioned to aggregate and manage consolidated IPP and utility fossil fuel supply requirements and fuel supply delivery infrastructure.

[23]This would be applicable to IPPs who currently utilize liquid fossil fuels and could switch to LNG. It would not be applicable to the AES Coal plant.

- *IPP "tolling" model for new generation* – Third party-owned generation that is operated under a tolling model would enable the HECO Companies to procure fuel supply requirements for use in third-party generators, and also dispatch these units as required to meet system load in a least-cost manner. Under a tolling model, IPPs would develop, own, operate and maintain generating plants. The HECO Companies would not have any financial interest in a facility or its operation. The utility would effectively rent generation capacity and have a contractual right to convert utility-supplied fuel into electricity. Contractual specifications could be defined by plant availability, heat rate and other key operational parameters. Moving to a tolling model may re-focus IPP contract negotiations on securing power supply at actual plant costs, not avoided energy cost.

Under this alternative business model, the HECO Companies would effectively over time become the "independent" power supply integrator and operator of Hawaii's power supply system similar to the roles performed by mainland Independent System Operators (ISOs) who independently dispatch generation and operate the bulk power system to minimize energy costs while maintaining reliability. ISOs typically plan and operate portfolios of generation and transmission assets owned by (or contractually controlled by) IPPs, electric utilities and power marketers.

In summary, the HECO Companies' future role in power generation could evolve to include generation resource planning, third-party generation capacity procurement, fuel supply management and procurement, and power supply dispatch and operational optimization. These are critical planning, technical, operational and commercial functions that will determine in large part the amount of renewable energy integration and the overall cost of power supply in Hawaii. However, the regulatory model under which the HECO Companies are compensated for performing these functions needs to be redefined. Capital investment (rate base) as the sole driver of utility profits would need to be replaced with a regulatory model that incentivizes and rewards the HECO Companies for success in managing the overall cost and reliability of power supply from the perspective of customers. An examination of potential changes in the regulatory model affecting the HECO Companies' power supply function is explained below.

Key Business Function #2 - Modern Transmission-and-Distribution System Integrator

The modernization of the island grid infrastructures is essential to enable Hawaii's electric utilities to integrate greater amounts of both utility-scale and distributed renewable energy resources. It could also facilitate the development of regional and strategically located integrated energy districts that could improve grid reliability and provide greater resiliency. Hawaii's electric utilities, by virtue of becoming "network systems integrators and operators",

will have to adjust their business model relative to transmission-and-distribution functional activities. A business strategy focused on energy delivery would enable the HECO Companies to concentrate on developing a world-class, modern island grid infrastructure to accommodate and deliver substantial quantities of clean energy resources. This is a functional area where many new technological advances are occurring, and new revenue-earning opportunities are emerging, including deployment of advanced metering infrastructure, smart grid devices, smart inverters, energy storage, and electric vehicles.

Under this strategy, new investment in transmission-and-distribution infrastructure will grow at a faster pace in the future due to grid modernization and smart meter investments, which could offset loss of largely depreciated generation rate base investments as old, inefficient utility fossil generation is retired. An already significant portion of HECO's current utility net plant in service (rate base) is comprised of energy delivery, not generation, capital investments; consequently, the major portion of HECO's total authorized common equity net income is already being derived from the energy delivery function.

Regulatory Policies and Energy Pricing Should Reflect New Business Models

The Commission observes that the current regulatory cost-recovery model for the HECO Companies may be increasingly at odds with major public policy goals to reduce electric rates and increase renewable energy utilization. More specifically, the Commission is concerned that the HECO Companies may not currently have the appropriate financial incentives to encourage timely and full implementation of the required actions set forth in *Section 1: Creating a 21st Century Generation System.*

The current regulatory cost-recovery model for power supply in Hawaii includes different regulatory mechanisms and processes to provide the HECO Companies with the opportunity to fully recover the total cost of the power supply function. The principal regulatory mechanisms and processes for power supply cost recovery include:

- *Base electric rates recover utility power plant fixed costs* – Power plant fixed costs include: plant operation and maintenance expenses, annual plant depreciation expense (recovery of plant investment), taxes and allowed return on utility plant investment. Commission authorized profit on utility generation is governed by the level of utility capital investment in power plants and fuel supply infrastructure. Base rates are adjusted periodically in rate cases, which are currently on a three-year rate case cycle.

- *Energy Cost Adjustment Clause (ECAC) recovers utility generation fuel expenses and costs of energy purchased from IPPs* - The ECAC mechanism is an automatic cost pass through rate recovery mechanism that enables the HECO Companies to adjust the ECAC surcharge up or down monthly to reflect changes in energy prices from the base level

established in the most recent rate case.[24] The ECAC mechanism is reconciled quarterly to ensure that recorded ECAC revenues match allowed ECAC expenses to ensure full recovery in light of changes in electric sales.

- *Purchased Power Adjustment Clause (PPAC) recovers capacity and other fixed contractual payments payable to IPPs* - These payments typically include annual contractual price adjustments to reflect changes in inflation. The PPAC surcharge is adjusted quarterly to reflect changes in fixed cost obligations and also to reconcile PPAC revenues with applicable PPAC expenses to ensure full recovery in light of changes in electric sales. The PPAC, in conjunction with the ECAC cost recovery mechanism, ensure that the total costs of purchased power from IPPs are fully recovered from customers.[25]

The HECO Companies essentially do not earn a profit or experience a loss due to changes in fuel prices. These expenses represent 80 - 85% of total power supply functional costs and 60 - 65% of total utility cost of service.[26] However, the current ECAC does contain a utility generation heat rate mechanism, which is intended to incentivize the HECO Companies to operate utility generation efficiently.[27]

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[24]Although the ECAC mechanisms are intended to recover changes in fuel and purchased energy expenses from levels established in last rate case, this mechanism can result in the recovery of hundreds of millions of dollars of energy costs if oil prices escalate significantly between rate cases or before the ECAC base level is reset to reflect current oil prices.

[25]Bond rating agencies consider the fixed payment provisions in IPP contracts to be equivalent to long-term debt. The PPAC mechanism reduces the financial risks to the utility associated with the cost recovery of PPA fixed payments and therefore reduce the concern that the HECO Companies will not be able to recover these costs in a timely manner.

[26]In spite of the fact that fuel expenses constitute the single largest expense category for each of the HECO Companies, the ECAC mechanism has not received a high level of regulatory scrutiny in the past. The Commission has initiated an investigation into the HECO Companies generation dispatch practices and protocols as part of the Power Supply Improvement Plans HECO, HELCO and MECO are required to file with Commission.

[27]ECAC heat rate deadbands were implemented in conjunction with sales decoupling to adjust for changes in utility power plant heat rates due to integration of renewable energy resources. The increased penetration of intermittent renewable energy resources has precipitated the need to modify utility power plant operations in order to accommodate these resources which in turn has adversely affected power plant heat rates. The HECO Companies have realized small annual pre-tax gains and losses due to actual versus target heat rate performance at utility power plants. However, these annual gains and losses have paled in comparison to rate increases experienced by customers due to increases in oil prices.

The Commission is concerned that under the current regulatory cost-recovery model for power supply the utilities lack correct incentives to control power supply costs, aggressively pursue long-term contracts with IPPs for new renewable energy projects, and expeditiously retire old, inefficient generation units. The Commission notes the following concerns with the current regulatory cost-recovery model:

- *Lack of correct incentives to control power supply costs* – Under the cost pass-through structure of the ECAC mechanism, the HECO Companies have no direct financial incentive -- reward or penalty – to stabilize and reduce power supply fuel costs, minimize curtailment of low-cost renewable energy, or maximize use of cost-effective renewable energy sources. Simply stated, the utility is insulated and has no direct financial "skin in the game" as to whether fuel costs, and by extension, the ECAC surcharges increase or decrease. Yet, this is the single largest category of utility costs.[28]

- *No direct financial incentive to pursue independent, third-party IPP clean energy projects* - Long-term utility power generation profits are tied solely to level of capital investment in utility generation assets (rate base). Utilities do not profit from implementation of customer-owned and utility-scale IPP renewable energy projects since utility capital investments opportunities are avoided or made by independent entities, respectively. Simply stated, the HECO Companies do not have any financial incentive to contract with IPPs for additional power supply resources.[29]

- *No direct financial incentives to accelerate retirement of fossil generating units* – A key goal of Hawaii's clean energy transformation is to substantially displace existing fossil generation. A utility generation plant must be "used or useful" to be included in rate base.[30] Retirement of existing utility fossil generation could cause undepreciated utility

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[28]Act 162 (2006 Session) sets forth requirements for automatic fuel rate adjustment clauses which states, in relevant part, that such clauses should (1) [f]airly share the risk of fuel cost changes between the public utility and its customers; and (2) [p]rovide the public utility with sufficient incentive to reasonably manage or lower its fuel costs and encourage greater use of renewable energy. Circumstances have changed substantially since the passage of Act 162 , such that a re-examination of the existing ECAC mechanism may be warranted.

[29]While the Commission has established a penalty mechanism in the event a utility fails to comply with RPS requirements, this mechanism does not provide economic incentive to contract with IPPs for additional renewable energy projects. The HECO Companies, for example, could comply with RPS requirements by utilizing liquid biofuels in existing utility power plants to the extent necessary and thereby would not need additional IPP contracts.

[30]

plant capital investment to be removed from rate base since "retired" utility generation plant would no longer be in service, thus reducing future utility profits. Whether a utility would be eligible to recover the remainder of plant costs from customers creates potential "stranded cost" uncertainties for the utilities. It is unclear whether the HECO Companies' proposed fuel switching strategies for old, inefficient fossil generators is guided to an unreasonable extent by the desire to avoid potential fossil generation stranded costs. Modernization of Hawaii's existing generation fleet will require acceleration of utility generating plant retirements.[31]

- Lack of transparent price signals to evaluate the supply of ancillary services – The cost of utility generation, including provision of individual ancillary services, has not been unbundled to provide appropriate price signals. The lack of transparent ancillary service price signals in Hawaii hampers development of non-fossil generation resources to provide ancillary services such as energy storage or demand response.

New Regulatory Incentives to Achieve Hawaii's Clean Energy Future

Hawaii's existing electric utilities represent the sole wholesale purchaser of fossil and renewable energy and ancillary services on each island's electric grid. The HECO Companies manage the price and terms and conditions under which energy projects are developed through control of PPA negotiation and competitive procurement processes. As a consequence, the HECO Companies determine when, and at what pace, utility-scale renewable energy projects, as well as new technologies to accommodate additional renewable generation (e.g., DR and storage), are developed in Hawaii, and the terms and conditions under which development can occur. It is essential that properly structured power generation cost recovery and financial incentive mechanisms are in place to guide and reward the HECO Companies for implementing strategies and actions set forth in *Section 1: Creating a 21st Century Generation System* and *Section 2: Creating Modern Transmission and Distribution Grids*.[32]

A number of potential regulatory solutions are available to incentivize the utilities to better manage their power supply costs and achieve public policy goals. These include:

- Incentive mechanisms to increase renewable energy, minimize power supply energy costs, reduce emissions and maintain bulk power supply reliability (Acts 37 and 162 frameworks);

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[31]Potential exists for new highly efficient, flexible generators to be less expensive than continued operation of existing utility generation.

[32]Act 37 (2013 Session) and Act 162 (2006 Session) provide legislative guidance for addressing many of the generation cost recovery and incentive regulatory issues identified here.

- Fossil generation retirement incentive mechanism to encourage acceleration of utility generating unit retirements, including potential use of securitization to allow the utilities to exit the generation business financially;

- A prohibition on developing new generation resources or undertaking major modifications to existing utility generating units by the HECO Companies;

- Unbundling ancillary services to provide price signals for alternative sources of supply; and

- Incentive mechanisms to invest in transmission-and-distribution grids consistent with the framework established by Act 37.

With new incentive mechanisms that better align utility performance with customers' interests and public policy, a financially healthy utility can be synonymous with achieving Hawaii's clean energy future.

Pricing of Utility Services Should Reflect New Business and Technical Realities

Current electric utility rate structures in Hawaii are not well suited for a future environment where there are significant quantities of variable renewable energy, customer-sited distributed energy resources and increasingly smart grid technologies. Existing utility rate and pricing structures need to be reconsidered to better respond to customer and technological changes. In addition, current rate structures do not provide the correct market signals to customers and market actors to address periods with an excess supply of energy to the grid. In this area, the Commission offers the following perspectives for consideration:

"Unbundled" rate structures could more appropriately fit customer preferences for varying levels of electricity service - Today, typical electric rate tariffs contain a bundled rate (price) to recover the cost of providing both utility electricity supply and energy delivery services. Unbundled rates that separate power supply, ancillary services, and energy delivery costs could more properly account for utilizing different mixes and quantities of various utility services where each customer would be charged accordingly. Customers with distributed generation are likely to utilize different combinations of utility-supplied electricity and grid-delivery services than customers without distributed generation. Under this structure, DER customers would pay for grid services they *utilize* and receive compensation for various grid support services they *provide*. An unbundled rate structure could also prevent shifting utility fixed costs from customers with distributed generation to customers without distributed generation, consistent with cost causation principles.

Greater utilization of capacity-based, fixed-cost based pricing – Most residential rate structures recover fixed and variable costs of electricity service primarily through charges based

on volumetric usage (per kWh). With increasing amounts of distributed energy resources where customers utilize grid infrastructure and backup capacity to varying degrees, rate structures may need to increasingly utilize pricing that more accurately reflects the different levels of service customers require from the utility. These changes could include recovery of utility fixed costs from residential and small business customers through capacity-based or fixed charges.

Time-of-use and dynamic pricing structures can help customer demand better match renewable energy supply - Non-time differentiated pricing structures are utilized predominately in Hawaii and hence rates do not vary by daily time periods or with changing electric system operational costs. With increasing utilization of low- cost renewable energy resources, it is appropriate to financially encourage customers to shift their electricity usage to time periods when excess supplies of lower-cost, variable renewable energy are available rather than curtail that lower-cost energy due to over-generation.

New incentives to reduce curtailment of renewable resources – As noted in recent regulatory decisions,[33] the continued growth of variable renewable resources (both utility-scale and customer-sited) is contributing to "network congestion" on each island grid where the total amount of variable renewable resources can exceed the capacity of the system, under current technical constraints, to accept additional variable renewable resources. The Commission is increasingly concerned about situations of "over-generation" during daytime hours where continued growth of presently uncontrollable export of energy from distributed generation could displace other low-cost, utility-scale renewables. This situation raises the cost of energy for customers without rooftop PV and does not achieve the state's policy goals to reduce fossil fuel use when one form of renewable energy displaces another. The Commission has ordered the HECO Companies to develop and file Power Supply Improvement Plans (PSIPs) and a Distributed Generation Interconnection Plan (DGIP) that will identify and prioritize system- and distribution-level technical improvements on each island to accept further renewable energy. However, the Commission notes that moving into the future, new technical measures and economic incentives may be necessary to allocate the grid's finite capacity to integrate variable renewable energy.

Supplemental power supply pricing structure – With increasing customer use of distributed energy resources, it may be appropriate to implement a supplemental power service tariff. This tariff offering would be structured to meet the needs of customers with distributed generator and /or energy storage, who may rely upon the utility to provide only a portion of total power

[33]See Order No. 32055, filed April 28, 2014 in Docket No. 2011-0092; Decision and Order No. 31758 filed December 20, 2013 in Docket No. 2012-0046; Decision and Order No. 31758, filed Dec. 20, 2013 in Docket No. 2012-0212; and Decision and Order No. 32053, filed April 28, 2014 in Docket No. 2011-0206.

supply requirements, either due to customer choice or meteorological conditions. Current utility tariff structures are designed to recover fixed costs of generation from a customer predicated upon customers taking their entire electricity requirements from the utility.

By establishing pricing that more accurately reflects the economic costs of grid operations, the electric utilities can recover the costs of grid investments that benefit all customers, third party energy service providers could develop new offerings to meet customer energy needs and support grid operations, and customers would have a growing array of options better suited to the changing demands of their homes and businesses.

Existing Utility-Customer Regulatory Compact May Need to be Modified

Investor-owned electric utilities in Hawaii, and in most U.S. mainland states, operate under a utility-customer regulatory compact that has existed for a century and requires the utility to fulfill public interest obligations, and in return, receive certain financial compensation. These obligations and benefits stem from legal and regulatory determinations that an electric utility is a business that is necessary and exists to serve the public interest. Electric utilities provide an essential service to society, are highly capital-intensive business enterprises and operate as a monopoly in order to achieve scale economies and avoid duplication of delivery infrastructure. The two basic tenets of the regulatory compact are as follows:

- An electric utility monopoly has an obligation to serve all customers at just and reasonable rates, established by regulatory commission, and in return, the utility is afforded an opportunity to earn a reasonable return on capital invested in utility plant and equipment necessary to fulfill the obligation to serve. This portion of the regulatory compact is more widely recognized.

- Consumers are protected by paying just and reasonable regulated rates for essential services supplied by a monopoly electric utility and in return, are expected to take electric service only from the incumbent electric utility. The latter provides an electric utility with reasonable assurances that capital invested in utility plant to be operated for many decades will be repaid over the plant's useful life. This portion of the regulatory compact is often overlooked yet is fundamental to utility's ability to attract capital on reasonable terms to invest in utility plant assets without unreasonable financial risk that these investments will eventually be recovered from utility customers. Customers' obligation to take and pay for utility service is an essential corollary to a utility's obligation to serve.

However, fundamental tenets of the long-standing regulatory compact were challenged by the introduction of customer choice on the mainland in the 1990s. Currently, they are being challenged in Hawaii with the emergence of customer choice to install distributed generation.

Customer choice modifies the second tenet of the regulatory compact. Utility customers are no longer obligated to take electrical supply from the incumbent utility under a customer choice paradigm. When this occurs, an electric utility is no longer assured a revenue stream that would provide a reasonable opportunity to recover and earn a fair return on utility plant investment devoted to public service. Without an expectation of earning a reasonable return on capital devoted to public use, because customers are no longer obligated to purchase electricity supply from the incumbent utility, the other major regulatory compact tenet (obligation to serve) is effectively broken as well. With potential uncertain future customer energy supply requirements and revenue base, it is difficult for a utility to ascertain its long-term supply obligations and hence generation requirements that would not be stranded at some future point.

The traditional obligation to serve for a vertically-integrated electric utility consists of the collective obligations to interconnect new customers to the grid, generate electrical power and deliver the power to customers over the T&D grid. Utility regulators were forced to redefine the obligation to serve framework for mainland electric utilities in those states where retail customer choice was implemented. Customer choice was predicated upon a competitive electric generation market and therefore utility generation was deregulated. Utility generation was forced to be cost-competitive and compete against different power supply alternatives in large regional competitive wholesale power markets. In many customer choice states, incumbent vertically-integrated electric utilities were required to divest generation and thereby become T&D only regulated electric utilities.

T&D electric utilities by definition could not have an obligation to supply since they no longer owned generation assets with which to provide power supply.[34] The obligation to serve for T&D only electric utilities became the obligation to deliver power from competitive alternative electricity suppliers to utility customers. In some cases, T&D utilities were also required to be the supplier of last resort in the event competitive alternative electricity suppliers defaulted or customer did not participate in competitive market. In these cases, the supplier of last resort obligation was accomplished by procuring power supply, as necessary, from wholesale power markets or IPPs.

Hawaii's customer choice situation is different and more complex than customer choice on the mainland. Mainland competitive alternative electricity suppliers are required to supply a customer's full electricity supply requirements across all hours of the year. Competitive alternative electricity suppliers effectively assume the obligation to supply but do so pursuant to private contract terms. To accomplish this, the competitive suppliers secure through

[34]A similar policy situation could arise in Hawaii with respect to utility's obligation to provide power supply depending upon the HECO Companies' future ownership of power generation.

contracts sufficient generation capacity plus applicable reserve margins to serve their portfolio of competitive customer load. Customers' load profiles and use of the T&D system remains the same regardless of whether they receive default power supply from T&D electric utility or competitive market power.

Customer choice is emerging in Hawaii by virtue of utility customers being able to install customer-owned generation and thus no longer obtain a portion of their electricity supply from the incumbent electric utility. Customers using their own generators continue to be interconnected, and in most cases, continue to utilize the electric grid. To-date, customer-owned generation in Hawaii consists almost entirely of solar PV systems which are not capable of supplying customers' full electricity supply requirements across all hours of the year without relying upon utility generation to effectively serve as a storage device.

In spite of significant penetration of customer-owned generation, the HECO Companies continue to invest substantial capital in utility plant assets. The amount of utility plant investment has increased, not decreased, as more residential customers have installed solar PV systems and financially leave the system. The existing sales decoupling mechanism effectively guarantees a revenue stream for the HECO Companies and mitigates the loss of utility revenue due to customer choice in the near-term. However, the sales decoupling mechanism was never intended to be a substitute for the long-term utility-customer regulatory compact.

The long-term obligation for Hawaii's electric utilities to interconnect customer-owned generation, to supply distributed generation customers with supplemental or back-up power supply and to provide grid capacity to enable power exports has not been defined. The Commission intends to examine the utility-customer obligation to serve policy issue as part of its forthcoming larger examination of the technical, economic and regulatory issues associated with distributed energy resources.

Conclusion

In this statement of inclinations, the Commission has discussed key technical, market, and public policy changes that will continue to shape the electric utility business in the future. To date, the Commission has not observed sufficient urgency by the utility in addressing this rapidly changing business environment and was compelled to offer this guidance to better align the HECO Companies' business model with customers' interests and public policy goals. By providing direction on future business strategy, energy resource planning, and project review in the three sections of this document, the Commission has outlined broad strategic focus in key areas of the electric utility business and potential regulatory reforms. It is now incumbent on the HECO Companies to utilize this guidance in developing a sustainable business model that

explicitly governs the Companies' capital expenditure plans, major programs, and projects submitted for regulatory review and approval.

CERTIFICATE OF SERVICE

The foregoing order was served on the date of filing by mail, postage prepaid, and properly addressed to the following parties:

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In addition, the foregoing Order was sent via electronic mail to the Advisory Group members by the commission's Independent Entity.